Financial Stability Report
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December 2012

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Foreword

This FSR, the sixth in the series, is set in an environment of global and domestic macroeconomic instability and uncertainty. The unconventional tools, which central banks and governments used effectively at the beginning of the crisis, have lost some of their edge and effectiveness. The space for fiscal and monetary actions is getting squeezed. Some unintended consequences of the unconventional measures have started manifesting, and the timing and pace of exit from these policies could bring on fresh risks and destabilize the system. Confidence in the financial sector remains low, uncertainty persists and investment climate globally is yet to revive. Europe and Japan are technically in recession. Growth in the US is slow, and if the "fiscal cliff" problem is not resolved effectively and in good time, the adverse macroeconomic impact on the US economy would be large and abrupt, with ramifications for the entire world. China is looking poised to grow reasonably well, but the euphoria over BRICS as a growth engine has been dented.

Economic growth in India has moderated in recent quarters, buffeted by global headwinds and domestic policy uncertainties. Growth, however, needs to accelerate if the momentum of poverty reduction, employment generation and pay off from the demographic dividend is to be accelerated.

The Reserve Bank has been managing the balance between its multiple objectives of price stability, financial stability and sovereign debt management - the holy trinity - under conditions of persistent inflationary pressures, slowing growth, widening current account deficit and a depreciating exchange rate.

The deteriorating asset quality of the banking sector has been engaging the attention of the Bank even though stress tests reveal that the system is still resilient to severe shocks. But one has to be aware that as Julie Dickson[1] says," A shock is a shock because the unexpected happens – the system does not behave the way you think it might". Thus, stress tests cannot capture the entire dynamics of distress. The FSR has therefore, been using a multiplicity of tools and techniques to make an assessment of the shocks to the system.

The recent financial crisis has taught us some very important lessons. The general disenchantment with 'casino banking' in certain developed economies underscored the dangers of over-financialization of the real economy. Stephen G Cecchetti and Enisse Kharroubi in their recent paper on 'Reassessing the impact of Finance on Growth state', "*we estimate that for private credit extended by banks, the turning point is closer to 90% of GDP - somewhat lower than for total credit. Many countries are close to or beyond this level, suggesting that more credit will not translate into higher trend growth. For example, in Portugal, private credit by banks was 160% of GDP at the onset of the financial crisis. The corresponding figure for the UK was 180% of GDP and even reached 200% of GDP in Denmark. By contrast, a country like India, where bank credit is less than 50% of GDP, can still reap significant benefits from further financial deepening in terms of increasing productivity growth*."

Over the past 60 years, we have seen several episodes of economic growth in different parts of the world. One clear lesson of this experience is that growth is sustainable only if it is inclusive. Governments around the world are therefore anxious that even as they pursue economic growth, they must make that growth process inclusive. There are many ways of understanding inclusive growth: the way I understand it is that inclusive growth is a process where the poor contribute *to* growth and the poor benefit *from* growth. A growth process that increases inequity lacks durability, and indeed even legitimacy, eventually threatening economic and social stability. Given the strong linkage between stability and inclusion, this FSR covers the initiatives by various financial sector regulators towards financial inclusion and literacy and the progress achieved.

Dr. D. Subbarao
December 28, 2012

[1] Julie Dickson is the current Superintendent of the Office of the Superintendent of Financial Institutions, Canada.

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List of Select Abbreviations

ALM	Asset Liability Management
ALCO	Asset Liability Management Committee
AMA	Advanced Measurement Approach
AMCs	Asset Management Companies
ATMs	Automated Teller Machines
BC	Business Correspondent
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
BSDA	Basic Services Demat Account
BSE	Bombay Stock Exchange
BSI	Banking Stability Index
BSM	Banking Stability Measure
BSMD	Banking System's Portfolio Multivariate Density
CAD	Current Account Deficit
CCIL	Clearing Corporation of India Limited
CCP	Central Counterparty
CD	Certificates of Deposit; Credit to Deposit
CDR	Corporate Debt Restructuring
CDS	Credit Default Swap
CET1	Common Equity Tier 1
CME	Capital Market Exposure
CPI	Consumer Price Index
CRAR	Capital to Risk-weighted Assets Ratio
CRR	Cash Reserve Ratio
CSO	Central Statistical Organisation
CTD	Cheapest-To-Deliver
DICGC	Deposit Insurance and Credit Guarantee Corporation
DIIs	Domestic Institutional Investors
DMA	Direct Market Access
DPs	Depository Participants
D-SIBs	Domestic Systemically Important Banks
EBIT	Earnings Before Interest and Tax
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
EBPT	Earnings Before Provisions and Taxes
EBT	Electronic Benefit Transfer
ECB	European Central Bank, External Commercial Borrowing
EDEs	Emerging and Developing Economies
EIOPA	European Insurance and Occupational Pensions Authority
ELSS	Equity Linked Savings Schemes
FASB	Financial Accounting Standards Board
FATCA	Foreign Account Tax Compliance Act
FB	Foreign Banks
FCs	Financial Conglomerates
FFIs	Foreign Financial Institutions
FII	Foreign Institutional Investor
FIPs	Financial Inclusion Plans
FPO	Follow on Public Offer
FRA	Forward Rate Agreement
FSB	Financial Stability Board
FSDC	Financial Stability and Development Council
FSR	Financial Stability Report
GDCF	Gross Domestic Capital Formation
GDP	Gross Domestic Product
GDS	Gross Domestic Savings
GFD	Gross Fiscal Deficit
GFSR	Global Financial Stability Report
GNPA	Gross Non-Performing Advance
GOI	Government of India
G-SIFIs	Global Systemically Important Financial Institutions
HFT	High Frequency Trading
HLA	Higher Loss Absorbency
IA	Investor Association
Ind AS	Indian Accounting Standards
IASB	International Accounting Standards Board
ICR	Interest Coverage Ratio
ICT	Information and Communication Technology
IFCs	Infrastructure Financing Companies
IFRS	International Financial Reporting Standard

IMA	Internal Models Approach
IMF	International Monetary Fund
IOSCO	International Organisation of Securities Commission
IPO	Initial Public Offer
IRB	Internal Rating Based
IRDA	Insurance Regulatory and Development Authority
IRS	Interest Rate Swap
ITEs	Intra-Group Transactions and Exposures
JPoD	Joint Probability of Distress
KYC	Know Your Customer
LGD	Loss Given Default
MCA	Ministry of Corporate Affairs
MFs	Mutual Funds
MGNREGA	Mahatma Gandhi National Rural Employment Gurantee Act
MI	Micro Insurance
MMMFs	Money Market Mutual Funds
MSMED	Micro, Small and Medium Enterprises Development
MTM	Mark-to-Market
NAV	Net Asset Value
NBFCs	Non-Banking Financial Companies
NBFC-D	Non-Banking Financial Company – Deposit taking
NBFC-ND-SI	Non-Banking Financial Company-Non Deposit taking-Systemically Important
NDTL	Net Demand and Time Liabilities
NFFEs	Non-Financial Foreign Entities
NGO	Non-Government Organisation
NHB	National Housing Bank
NIM	Net Interest Margin
NPA	Non-Performing Advance
NPB	New Private Bank
NPS	New Pension System
NSCCL	National Securities Clearing Corporation Limited
NSFE	National Strategy for Financial Education
NSE	National Stock Exchange
OFIs	Other Financial Intermediaries
OPB	Old Private Bank
ORSA	Own Risk and Solvency Assessment
OSS	Off-Site Surveillance
OTC	Over The Counter
PAT	Profit After Tax
PCR	Provision Coverage Ratio
PFRDA	Pension Fund Regulatory and Development Authority
PMI	Purchasing Managers Index
PoD	Probabilities of Distress
PSBs	Public Sector Banks
PRA	Prudential Regulation Authority
QFIs	Qualified Foreign Investors
RBI	Reserve Bank of India
RoA	Return on Assets
RRB	Regional Rural Bank
RWA	Risk-Weighted Asset
SCBs	Scheduled Commercial Banks
SEBI	Securities and Exchange Board of India
SEC	Securities and Exchange Commission
SGF	Settlement Guarantee Fund
SLI	Systemic Liquidity Index
SLR	Statutory Liquidity Ratio
SUCB	Scheduled Urban Co-operative Bank
TCE	Total Credit Exposure
TER	Total Expense Ratio
TI	Toxicity Index
TRs	Trade Repositories
TSA	The Standard Approach
VaR	Value at Risk
VAR	Vector Autoregression
VI	Vulnerability Index
WPI	Wholesale Price Index
WOS	Wholly Owned Subsidiary
WG	Working Group
Y-o-Y	Year-on-Year

Overview

Macrofinancial Risks

Global

The outlook for global growth continues to be grim. Global growth forecasts have been lowered by major global agencies. Much of the Euro Area and Japan are experiencing negative growth while growth in the US is still low. The continuance of the Euro Area Sovereign Debt Crisis and uncertainty over the US fiscal cliff are major downside risks to global growth and financial stability. Efforts to deal with the crisis are underway in Europe. For Emerging and Developing Economies (EDEs), the threat of spillovers remains significant in view of the depressed outlook for global trade and volatile capital flows. Although inflation pressures appear to be moderating, elevated food and commodity prices remain contingent risks, especially for economies facing domestic supply constraints. A major risk to the outlook stems from political economy considerations that could impede, delay or erode resolute policy action and the consequence could be deepened financial stress and heightened risk aversion.

Domestic

The overall macroeconomic risks in the Indian financial system seem to have increased since the publication of the previous Financial Stability Report (FSR) in June 2012. Decline in domestic growth coupled with relatively high inflation, fall in domestic savings, particularly household financial savings, fall in investment demand and moderation in consumption have increased the risks to macroeconomic stability. In addition, high current account deficit, stressed fiscal situation, increasing leverage and falling profitability of the corporate sector have emerged as pertinent issues for macroeconomic stability.

Fiscal Assessment

The central government's gross fiscal deficit (GFD) up to October 2012 constituted about 72 per cent of the budgeted amount for the whole year as against 74 per cent during the corresponding period of previous year. There could be some shortfall in tax and non tax revenue of the government during the current year on account of economic slowdown. Also there could be some overshooting of government expenditure.

External Sector

Stress on the external front remains elevated. Although, as compared to the previous quarter, the current account deficit to GDP ratio has fallen, it still remains high. Gold imports continue to account for a large part of the CAD. Other external sector vulnerability indicators also show increased stress. Volatile capital flows could make CAD financing a challenge.

Financial Markets

Risks in the Indian financial markets fell marginally in the period under review. The liquidity deficit in the financial system increased in Q3 of 2012-13 after having eased during Q2 of 2012-13. Long and short term treasury yields remained largely range bound. The primary market in equities which was relatively subdued during early part of the year showed some signs of revival in the recent period. Sentiments in the secondary market have improved on increased FII inflows. However, a significant portion of the capital market issues were concentrated in bonds of banks and financial institutions, reducing their disintermediation function. There could potentially be an outflow from the equity market if the US fiscal cliff risk materalises stoking risk aversion.

Households

The household sector has traditionally been a stabilising factor in the Indian economy. However, there are signs of increasing stress in this sector with a fall in household financial savings; households have been shifting away from financial assets into physical assets and valuables such as gold.

Corporate Sector

The corporate sector has also been showing signs of increased stress. Ability of corporates to service

borrowing with present level of profits has fallen since 2009-10 and it is currently below the levels of 2008-09. Leverage of coporates exposed to the infrastructure sector has increased. Until recently, the primary equity market was dormant and this could, among other factors, have led to increasing leverage of the corporate sector.

Systemic Risk Survey

Systemic risk survey indicates that global issues such as the fall in global growth and sovereign risk/contagion are perceived to be prominent risks for the financial system. On the domestic front, increasing fiscal deficit and deterioration in growth outlook have emerged as important risk factors.

Financial Institutions: Soundness and Resilience

Banking Sector Risks

The risks to the banking sector have been increasing in recent years. Tight liquidity, deteriorating asset quality and reducing soundness are the major contributors to the decline in stability of the banking system. However, a marginal improvement in the banking stability indicator during the last two quarters is primarily because of better liquidity conditions.

Banking Stability Measures

The probability of distress of the entire banking system seems to have reversed its upward trend and registered a marginal decline in the recent period. Various indicators of distress dependencies in the banking system reveal that there has been no significant change in the risk over the last few quarters.

Network Analysis

The analysis of the network of the Indian financial system finds that the inter linkages in the system are strong. Interconnectedness in the financial system in India arises from both funding dependencies and direct credit exposures especially among banks, on the one hand, and insurance companies, mutual funds and non-banking financial companies (NBFCs), on the other. An assessment of the impact of the liquidity contagion in the Indian banking system has been attempted in this issue of the FSR. There has been no major shift in the pattern of interconnectedness or contagion risks in the system in the recent periods.

Scheduled Commercial Banks

Capital Adequacy and Asset Quality

The overall capital adequacy ratio has deteriorated since March 2012 though it remained well above the regulatory minimum. The decline in CRAR was more pronounced for the public sector banks. In addition, asset quality of banks has seen considerable deterioration during the half year ended September 2012.

Restructuring of Advances

Restructuring of loans, particularly of big ticket loans under the corporate debt restructuring (CDR) mechanism, has recently come under closer scrutiny due to the steep rise in the number and value of such advances. Of late, the growth in restructured advanced has outpaced the growth in gross advances of the banking system.

Profitability

Profitability of the banking sector has increased in the recent past, partly, due to a fall in growth of interest expenditure relative to interest income. The profit after tax has grown at 36.8 per cent at end September 2012, reaching close to the growth rate of 37.4 per cent observed in the period before the global financial crisis.

Financial Sector Regulation and Infrastructure

Implementation of Global Reforms

The global regulatory reform initiatives launched in wake of the global financial crisis are at various stages of implementation, where consistency across jurisdictions becomes critical to ensuring that opportunities for regulatory arbitrage do not emerge.

Basel III Implementation

Final guidelines for Basel III implementation have been issued in India. Banks in India are relatively well placed for migration to the new capital regime. However, the recent deterioration in asset quality as well as proposed changes in provisioning norms could pose challenges for banks.

Advanced Approaches under Basel II

Use of complex models for capital calculations pose challenges even as several banks are gearing up to migrate to advanced approaches under Basel II. Associated validation and accredition processes will assume criticality in ensuring that complex modeling is not used to optimistically calculate risk weights resulting in dilution of capital or other regulatory requirements.

Banking Frauds

Losses incurred by banks in India due to frauds are on the increase. These trends, as well as several high profile cases of frauds in banks globally, have focused attention on the importance of operational risk capital. In the Indian context, however, there are formidable challenges in measuring the extent of operational risks given the lack of historical data on operational loss events.

Shadow Banking

The emergent policy framework for the shadow banking system aims to mitigate potential systemic risks across the globe while recognising the useful economic role played by them. The non-banking financial system in India is within a regulatory perimeter but there are some gaps in terms of regulatory coverage and data availability, which are being looked into jointly by all regulators.

Financial Market Infrastructure

The country's financial market infrastructure has been functioning smoothly. Potential risks posed by procyclicality of margin movements in the CCIL settlements and various equity exchanges, and exposures of equity market central counterparties (CCPs) to the settlement banks will need to be monitored. There are challenges in migrating all OTC derivative transactions to central clearing given lack of standardisation, sufficient liquidity and readily available pricing information in some products/ markets. In India, a trade repository for OTC derivative products has been launched. Guaranteed clearing of foreign exchange forward transactions in the US$ /INR segment has been mandated.

Financial Inclusion

Globally, the triad of Financial Inclusion, Financial Literacy and Consumer Protection has been recognized as intertwining threads in pursuit of financial stability. In India, the financial sector regulators have been working towards furthering financial inclusion and improving financial literacy through concerted efforts, which are featured in this issue of FSR.

The Financial Stability Report December 2012 includes inputs from GOI, SEBI, IRDA and PFRDA.

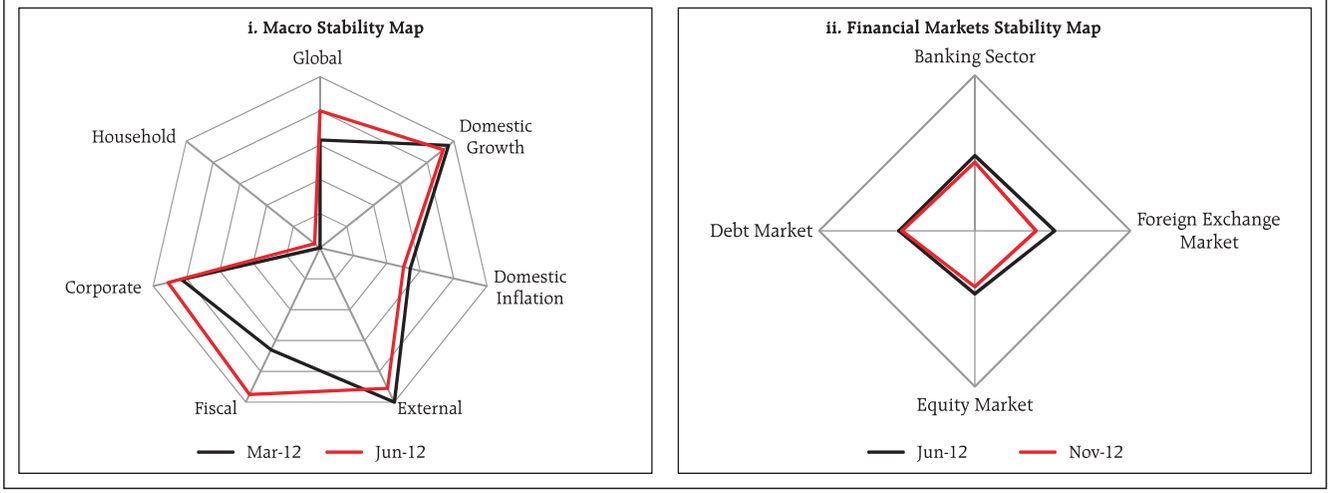
Chapter I

Macrofinancial Risks - An Assessment

Globally, growth risks seem to have risen and could offset the positive effects of enhanced liquidity. Although, liquidity infusions by major central banks have contributed to some stability in global financial markets these do not seem to be a substitute for structural solutions. Further, fiscal stress and sovereign debt problems continue to be major risks to market stability and with commodity prices still at elevated levels, risks of liquidity-driven price increases also remain significant. A major risk to the outlook stems from political economy considerations which could impede, delay or erode resolute policy actions and the consequence could be deepened financial stress and heightened risk aversion. Amidst this global slowdown and uncertainty, the Indian economy remains sluggish, held down by slowing investment, weakening consumption and declining exports. The loss of growth momentum which started in 2011-12, extended in the current year with growth remaining below the trend, however, inflation continued to remain above the Reserve Bank's comfort zone. On the external front, the current account deficit (CAD) remains above the comfort level and the Indian rupee witnessed depreciation pressure. Another worrying development has been the reduction in the share of financial assets in household savings as households' preference for physical assets and valuables like gold seem to be rising, which is also adding to the pressure on the CAD. Thus, lower growth, elevated inflation, high fiscal and current account deficits remain potential risks to financial stability. Global perceptions of India's ability to tide over the current economic weakening could hinge on its ability to effectively follow the roadmap for fiscal consolidation. This would vacate financial space for India's private sector which is competing with the government to attract a greater share of the falling household savings. There are also early signs of corporate leverage rising among the several industrial groups with large exposure to infrastructure sectors like power. Further, many companies have large foreign currency denominated overseas borrowings with unhedged exposures at a time when volatility in exchange rates remains elevated. These pose significant risks to the stability of the corporate sector. However, financial market conditions improved marginally in the period under assessment.

1.1 The overall macroeconomic risk to the Indian financial system seems to have increased since the publication of the previous Financial Stability Report (FSR) in June 2012. The global, fiscal and corporate sector risks have registered visible increases. The risks emanating from the household sector - which in the Indian context is a stabilising force – have increased marginally. The risks from domestic growth, inflation

Chart 1.1: Macro Stability Map and Financial Markets Stability Map



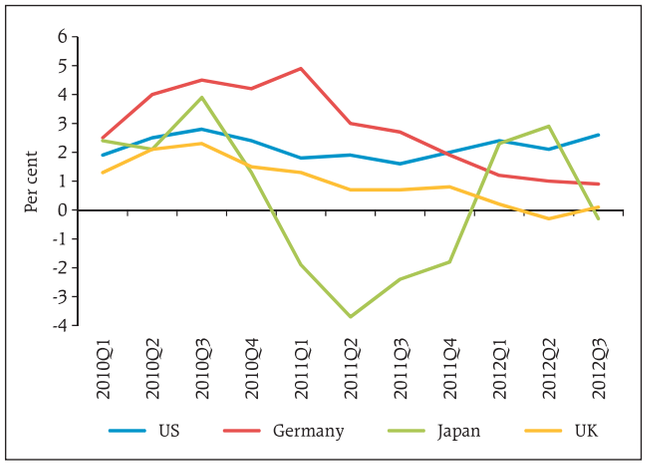
Note: Macro Stability Map based on data for all indicators available up to June 2012. Financial Stability Map is based on data available till November 2012. Movement away from the centre depicts increasing risk.
Source: RBI Staff Calculations

and external sector also remained elevated (Chart 1.1.i). Stability of the financial markets which was measured based on four segments of the market, namely, foreign exchange market, equity market, debt market and banking sector funding, show marginal softening of risks in all the segments compared to the previous FSR (Chart 1.1.ii).

Global Growth

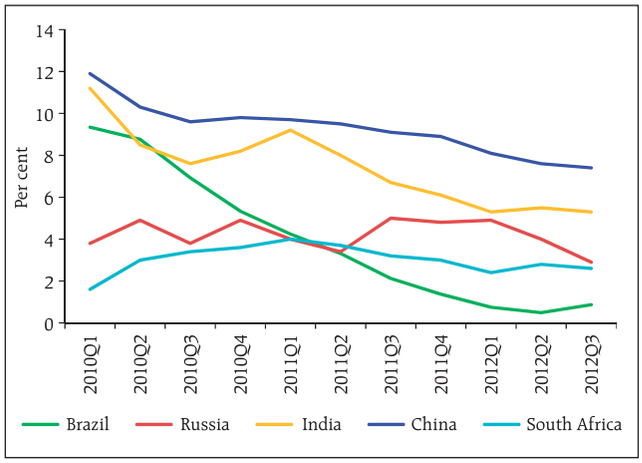
1.2 Economic growth remained sluggish around the world. The global economy grew slower during 2012 (upto September 2012) than previously anticipated (Chart 1.2 and Chart 1.3). The Euro area slipped into a technical recession in Q3 2012 with Spain, Italy and Portugal experiencing protracted recession. Slower than expected economic growth in the US has led to continuation of unconventional policy measures by the Federal Reserve. Failure to resolve the issues on debt ceiling and fiscal cliff could hamper economic decisions by corporates and households which in turn could slow growth further. Growth in Japan was estimated to be (-) 3.5 per cent, on an annualized basis, in Q3 2012. Growth in the Emerging and Developing Economies (EDEs) during Q2 2012 was also lower than in the previous quarters. Although inflation pressures appear to be moderating, elevated food and commodity prices remain contingent risks to economies facing domestic supply constraints.

Chart 1.2: GDP Growth in Advanced Economies



Source: Bloomberg

Chart 1.3: GDP Growth in EDEs



Source: Bloomberg

Euro Area Sovereign Debt Crisis

1.3 Global financial markets have been supported by announcements about European banking and fiscal integration. Investor confidence, however, remains susceptible to bouts of stress as there does not appear to be a definitive strategy to resolve the Eurozone crisis. Financial markets face risks from further deterioration of world growth prospects. While some measures have been taken to strengthen banks and sovereigns, the threat of negative feedback loops between sovereigns and banks remains a worry. European investors and banks in general are reducing exposures of foreign assets (within Europe) on fears of a country's exit from the euro or of large banking failures.

1.4 International regulations, particularly in the area of central counterparty arrangements in various market segments, and Basel-III liquidity requirements

have increased the demand for high quality collateral. The previous FSRs have discussed the trend towards greater collateralisation of transactions among banks and those with customers. Prolonged periods of economic slowdown in the advanced economies are likely to put further pressure on their already strained fiscal positions. The perception of safety of some of the European sovereigns has been dented and this reduces the available pool of high quality risk free government securities for use as collateral. This development thus could have negative consequences for the smooth functioning of financial markets.

1.5 Yields on 10 year sovereign bonds have fallen to record lows for core Euro Area countries and increased in the peripheral countries (Chart 1.4). This has resulted in marked increase in spreads of stressed sovereign bonds over German Bunds. The yields have fallen after the series of measures announced by the European Central Bank (ECB) in the recent past.

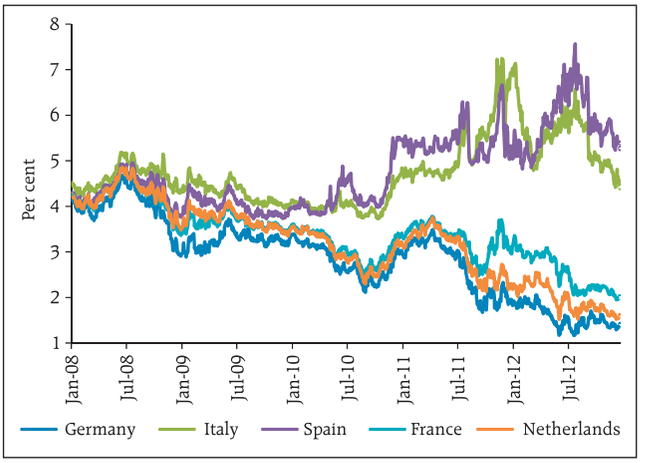
1.6 The International Monetary Fund (IMF) estimates that assets of 58 large European banks have fallen by about US $ 600 billion during Q3 2011 - Q2 2012. This has had implications for credit growth in the Euro Area with the peripheral nations being most affected. Although stabilising measures by ECB have slowed the de-leveraging process, credit to the private sector still remains weak as a large part of the ECB liquidity is being parked in the overnight deposit facility even though the interest rate on those deposits is zero (Chart 1.5).

International Financial Markets

1.7 Unconventional policy measures undertaken in some advanced economies have supported global equity markets during the year. After a period of subdued sentiments, optimism returned to global equity markets after the ECB President announced that the ECB was ready to use all possible means to save the Euro and the announcement of Outright Monetary Transactions (Chart 1.6 and Chart 1.7). However, fiscal cliff concerns have weighed on the bourses and the escalation of violence in the Gaza strip has also dampened sentiment.

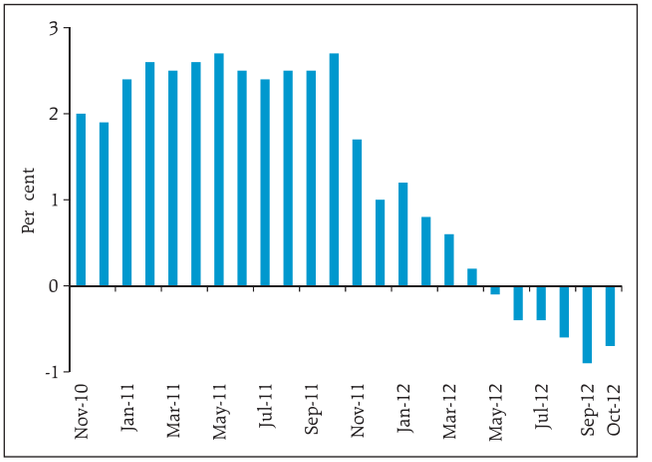
1.8 Bond yields for some developed economies have remained subdued due to safe haven flows and are close to historical lows. Investors across the world have

Chart 1.4: 10 yr-Sovereign Bond Yield



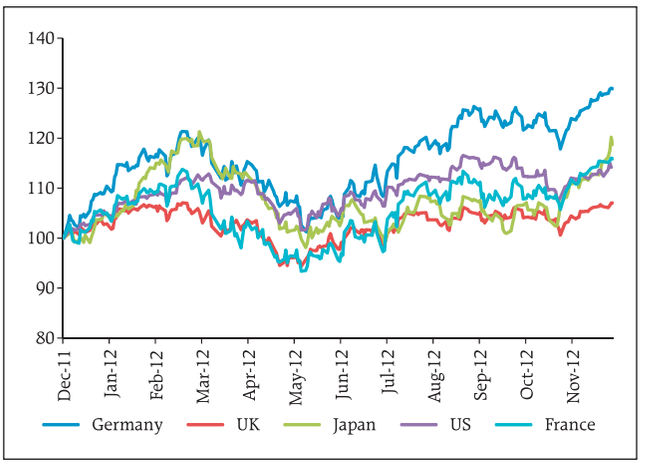
Source: Bloomberg

Chart 1.5: Growth in Loans to the Private Sector in the Euro Area



Source: ECB

Chart 1.6: Movement in Equity Indices of Advanced Economies (Re-Indexed to End December 2011=100)



Source: Bloomberg

increased their holding of government paper. Besides, flight to safety has also increased concentration risk in sovereign paper.

Prolonged Accommodative Policies-Downside Risks

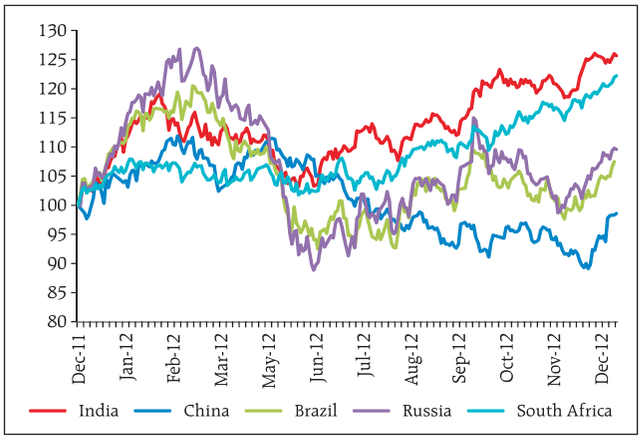
1.9 Advanced economy central banks have adopted accommodative monetary policies in response to the Global Financial Crisis and the Euro Area Sovereign Debt Crisis. This has been seen as necessary to halt the deflationary spiral and to stimulate growth in these economies and consequently promote growth globally. Some of these policies have been unconventional as the lower bound of interest rates had been reached at the early stages of the crisis. Balance sheet size of central banks around the world has expanded stoking fears of high inflation in the future. In addition, concerns over the prolonged use of unconventional policies have emerged especially in emerging economies.

1.10 Low yields for an extended time period tend to drive investors towards riskier assets in search of higher yields. Excess liquidity created by these policies has also fuelled volatile capital flows into emerging market economies. Such flows tend to be driven more by short term factors accentuating the risk-on-risk-off trends in financial markets. Low rates also reduce the opportunity cost of capital and hence the incentive of financial firms to monitor borrowers' financial health and ability to pay back debt.

1.11 Prolonged accommodative policies create a large demand for high quality financial assets. The pool of assets that central banks can hold is large but not infinite. Market for these securities could become illiquid if central banks hold a major portion of these securities and trading among private players falls leading to an increase in liquidity premiums[1]. In such a scenario, the very purpose of the accommodative policy is called to question. The increased demand could also create mis-pricing of the assets. Besides, lower bond yields could reduce fiscal prudence on part of the sovereigns allowing them to borrow more at lower rates.

1.12 Profitability of central banks could also be affected due to mark-to-market losses when interest rates rise. This could undermine the credibility of the central bank and affect financial stability. The exit strategy will have to be carefully calibrated by central banks and their credibility will be impacted severely if mistiming or wrong strategies stoke inflation expectations or raise rates too quickly.

Chart 1.7: Movement in Equity Indices of EDEs (Re-Indexed to End December 2011=100)



Source: Bloomberg

Commodity Prices

1.13 Commodity prices, as measured by the movement in the IMF's Primary Commodity Price Indices, have remained range- bound, after peaking in March 2012. The food price index trended sharply upwards during July-August 2012 and has edged down since September 2012. The softening in Q4 of 2012 was in view of a slowdown in euro area, Japan and emerging economies like Brazil, China and India. If this trend persists, inflationary pressures arising from commodity prices could be lower. However, quantitative easing being pursued by advanced economies poses some upside risks to global commodity prices (Chart 1.8).

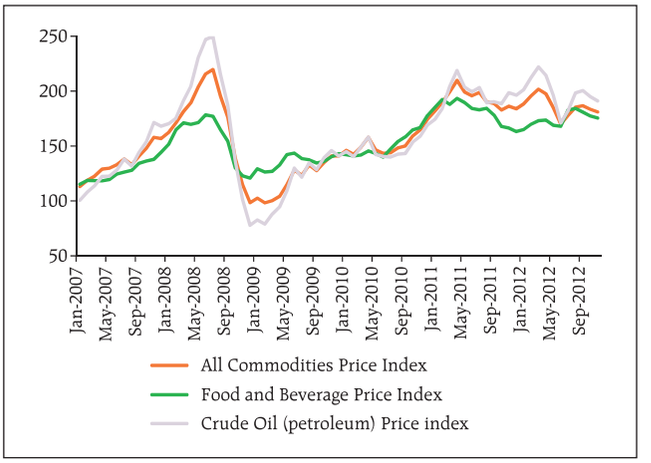
[1] Bernanke, B (2012), "Monetary Policy since the Onset of the Crisis", remarks at Federal Reserve Bank of Kansas City Economic Symposium on August 31, 2012, Jackson Hole, Wyoming

Domestic Growth

1.14 A number of domestic and external factors have caused a significant deceleration in economic growth in India during the last few quarters. GDP growth remained low at 5.3 per cent during Q2 2012. On the domestic front, structural impediments such as fall in domestic savings, persistently high inflation, regulatory and environmental issues resulting in a fall in investment demand and moderation in consumption spending have contributed to the fall in growth. All these factors seem to have brought down the potential growth rate to about 7 per cent.

1.15 Rise in industrial activity in October 2012 is attributed largely to base effect and festival demand. However, the significant rise in capital goods and the moderate increase in order book volumes are indications of a modest firming up of activity in Q3 of 2012-13. The Services Purchasing Managers Index (PMI) indicates a positive sentiment while the increase in rabi sowing coverage suggests improving prospects for agricultural growth. Even though inflation has softened in the recent period, the risks persist. On the external front, a weakening global economy has exacerbated the domestic slowdown.

Chart 1.8: Commodity Price Indices

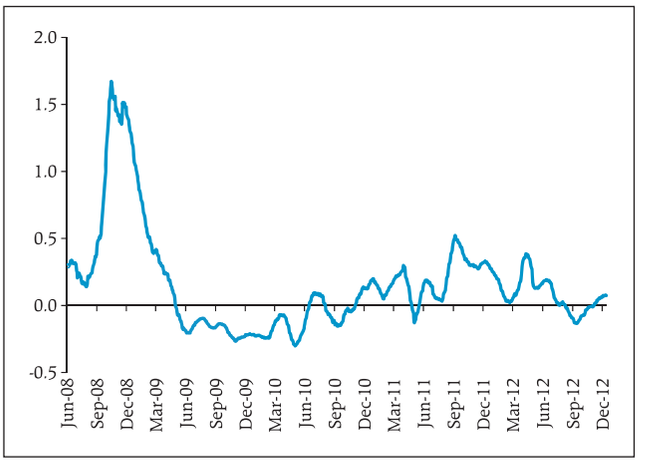


Source: IMF

Systemic Liquidity Index

1.16 There was a significant easing of the liquidity deficit in the banking system in Q2 of 2012-13, and the liquidity deficit mostly remained within the Reserve Bank's comfort zone of one per cent of Net Demand and Time Liabilities (NDTL) during this period. However, the liquidity conditions have tightened in Q3 of 2012-13 so far primarily on account of persistence of high government balances and the widening wedge between deposit and credit growth. The Reserve Bank's open market operation (purchase of government securities) added primary liquidity and contained the liquidity deficit. The Systemic Liquidity Index (SLI) which is based on a multiple indicator approach and aims to capture the overall funding scenario in the financial system *viz.*, the banking, non-banking financial, the corporate sectors and liquidity in foreign exchange market shows that the liquidity conditions have tightened marginally in Q3 of 2012-13 (Chart 1.9). Long and short term treasury yields remained largely range bound.

Chart 1.9: The Systemic Liquidity Index



Note: The SLI below zero denotes comfortable level of liquidity conditions in the system, whereas a level above zero implies tight liquidity conditions.

Source: RBI Staff Calculations

Fiscal Consolidation

1.17 The central government's gross fiscal deficit (GFD) up to October 2012 constituted about 72 per cent of the budgeted amount for the whole year as against 74 per cent during the corresponding period of previous year. However, there is likely to be some shortfall in revenue collections (tax and non-tax) during the current year due to slowdown in economic growth. At the same time, there is a possibility of some overshooting of the non-planned budgeted expenditure, especially due to additional allocation for various subsidies (fuel, food and fertilizer). The central government has already brought out first supplementary demands for grants involving net cash outgo of about `310 billion, a major part of which (`285 billion) is for petroleum subsidies. A revised fiscal deficit of 5.3 per cent was announced by the Finance Minister for the year. That can be achieved only through pruning down of expenditure and greater effort in revenue mobilization.

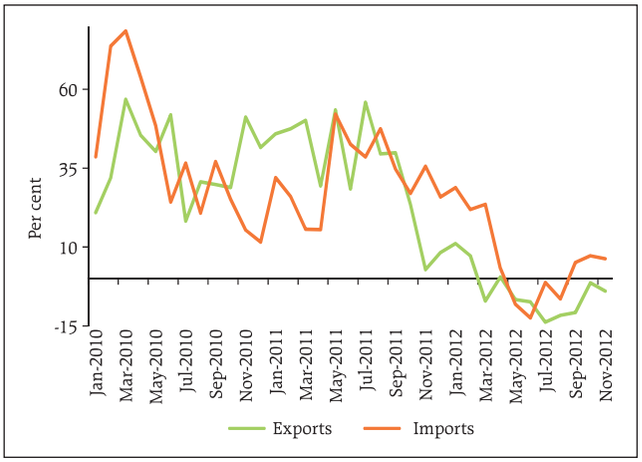
External Sector Vulnerabilities

1.18 Slowdown in global growth has reduced demand for Indian exports. On the other hand, imports have tended to slow to a lesser extent as the major portion is relatively inelastic (oil imports; Chart 1.10). This could exacerbate the current account deficit. In the face of general risk aversion, financing the CAD has become a challenge (Chart 1.11). The benefit of a depreciating currency has been muted due to weak external demand which could worsen on materialisation of US fiscal cliff.

1.19 The level of foreign exchange reserves impacts the financial stability through the confidence channel. Sharp deterioration in level of reserves could adversely impact the sentiment of the overseas investors. Further, given the fact that India is a current account deficit country, with adverse developments in international financial markets the domestic foreign exchange markets can be severely impacted if the macroeconomic fundamentals are not very strong.

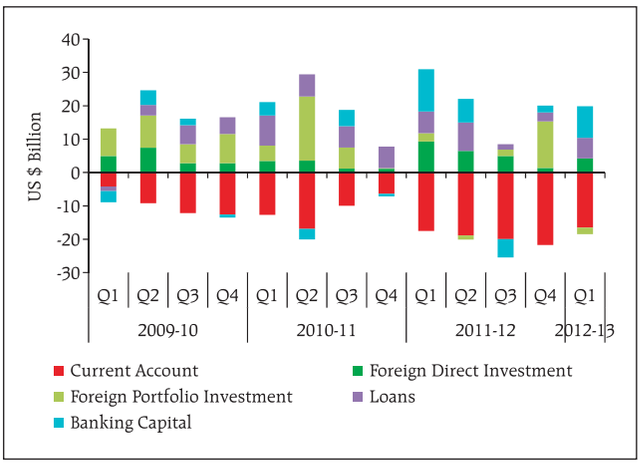
1.20 Adequacy of reserves has emerged as an important parameter in gauging the ability of a country to absorb external shocks. With the changing profile of capital flows, the traditional approach of assessing reserve adequacy in terms of import cover has been

Chart 1.10: Y-o-Y Growth in Indian Exports and Imports



Source: RBI

Chart 1.11: Financing of India's Current Account Deficit



Source: RBI

broadened to include a number of parameters which take into account the size, composition and risk profiles of various types of capital flows as well as the types of external shocks to which the economy is vulnerable. Although the CAD fell to 3.9 per cent of GDP in Q1 2012-13 from 4.5 per cent during Q4 2011-12, it is still high. External sector sustainability indicators have deteriorated in the recent past (Table 1.1). The indicators relating to the foreign exchange reserves point to a declining position. The absolute level of the reserves is, however, considered to be reasonable.

1.21 Against the backdrop of volatile flows, several measures have been taken to augment capital flows into India. A new investor class, Qualified Foreign Investors (QFIs), to include non-resident individuals has been permitted to invest in Indian equities, corporate bonds and mutual funds. The relaxations in debt inflows have been made to include a larger set of eligible sectors with the focus on attracting long term sources, particularly, real money investors. Permitted limits under ECBs have been enhanced and rationalised within prudential limits particularly for corporates having natural hedges to repay the ECBs from out of their foreign exchange earnings.

1.22 A series of economic reforms announced recently by the central government appears to have had a positive impact and boosted sentiments. Moody's has confirmed a stable outlook for India. However, other rating agencies like Fitch have warned that India's rating could be lowered if fiscal situation does not improve.

Un-hedged Exposure of Corporates

1.23 Excessive volatility in the exchange rate makes it difficult for economic agents to make optimal inter-temporal decisions. The economic agents, therefore, need to properly understand and measure the nature of currency risk embedded in their business and use appropriate derivative instruments to hedge their currency risks. Reserve Bank, over the years has expanded the menu of derivative instruments, both OTC as well as exchange traded ones which has provided greater flexibility to the market participants in managing their currency risk[2].

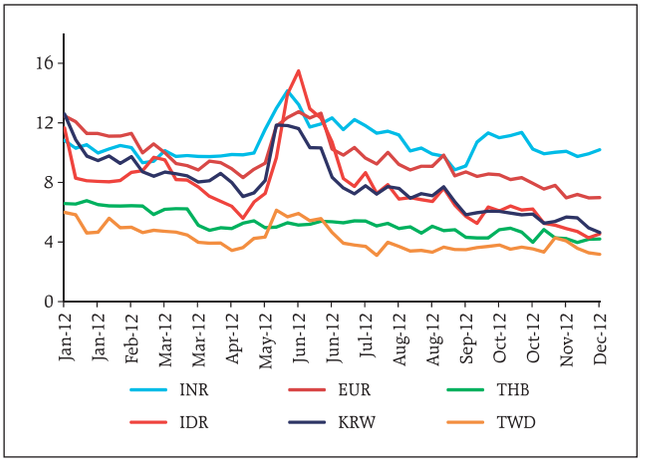
Table 1.1: External Sector Vulnerability Indicators
(Ratios in per cent)

Indicator	End-Mar 2011	End-Mar 2012	End-Jun 2012
Ratio of Total Debt to GDP	17.8	20.0	21.7
Ratio of Reserves to Total Debt	99.6	85.2	82.9
Ratio of Short-term Debt to Reserves	21.3	26.6	27.8
Reserves Cover of Imports (in months)	9.6	7.1	7.0
Reserves Cover of Imports and Debt Service Payments (in months)	9.1	6.8	6.6
External Debt (US$ billion)	305.9	345.7	349.5
Ratio of volatile capital flows to Reserves	67.3	79.9	81.3

Note: Volatile capital flows here are defined so as to include cumulative portfolio inflows and short-term debt.
Source: RBI

1.24 Unhedged foreign exchange exposure of corporates is a source of risk to them as well as to the financing banks and the financial system. Large unhedged forex exposures have resulted in accounts becoming Non-performing Assets (NPAs) in some cases. Banks were, therefore, advised in February 2012 that they should rigorously evaluate the risks arising out of unhedged foreign currency exposure of the corporates and price them in the credit risk premium while extending fund-based and non fund-based credit facilities. From the information submitted by banks, it is observed that a significant portion of foreign exchange exposures remained unhedged in the recent period. This is especially disquieting given that the exchange rate volatility has been higher in India in comparison to other emerging market currencies as well as those of advanced economies (Chart 1.12).

Chart 1.12: 1-Month Implied Volatilities of Various Currencies against the US dollar



Source: Bloomberg

[2] Padmanabhan. G (2012), ''Managing Currency Risk in the New Normal'', special address at the Iforex Leaders Summit, Mumbai on July 28, 2012, Mumbai.

Gold Imports

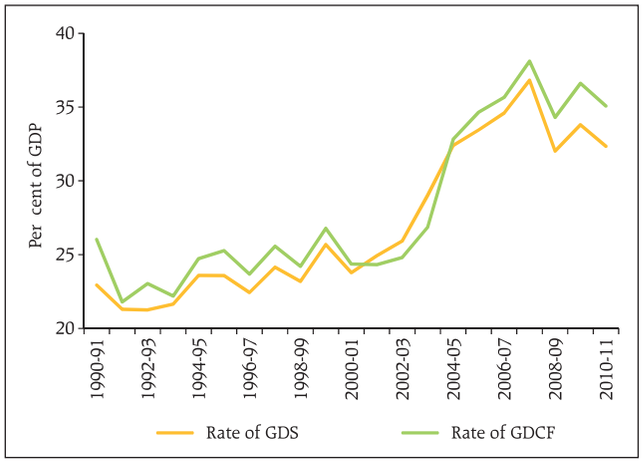
1.25 The FSR for June 2012 referred to rising imports of gold. Gold imports have continued to be high and have accounted for, on an average, over two-thirds of the CAD during the last three years. While India's share in international trade is less than 2 per cent and that in world GDP is less than 6 per cent in Purchasing Power Parity terms, it accounts for a quarter of world demand for gold.

1.26 Earlier this year, the government duties on the import of gold were hiked. This measure, *inter alia*, appears to have significantly dampened demand for gold in the June 2012 quarter. However, demand in the September 2012 quarter picked up significantly and was higher than the average of last 5 years (September 2007 to June 2012)[3]. The Reserve Bank reiterated its guideline prohibiting banks from lending for purchase of gold[4]. With rising domestic prices, recycling of existing stock of gold has received a fillip. While domestic supply of gold from recycling has doubled in September 2012 quarter compared to September 2011 quarter, it remains less than a seventh of total supply[5]. Gold linked financial products, which are not backed fully in physical form can help reduce its imports[6]. Inflation indexed bonds could also be one of the options to offer investors a hedge against inflation and dissuade them from gold investments[7].

Financial Savings

1.27 Investment in the Indian economy is largely financed by domestic savings. Saving and investment rates have been relatively high during the 2000s. Of late the gap between investment and saving rates has widened (Chart 1.13). Since 2008-09, savings rate has declined, led by a sharp fall in public sector savings, which has not been offset by increase in private savings. The household sector saving, which continues to account for a substantial portion of the domestic saving, witnessed a decline in 2010-11 mainly due to the decline in financial saving. The decline in household financial saving rate has persisted in 2011-12 (Box 1.1).

Chart 1.13: Saving and Investment Rates in India



Source: Central Statistics Office (CSO)

[3] Source : World Gold Council

[4] http://www.rbi.org.in/scripts/NotificationUser.aspx?Id=7695&Mode=0

[5] Source : World Gold Council

[6] Gokarn, Subir (2012), "India's Gold Problem: Finding Solution through Financial Products", speech at BANCON, on 25th November, 2012, Pune

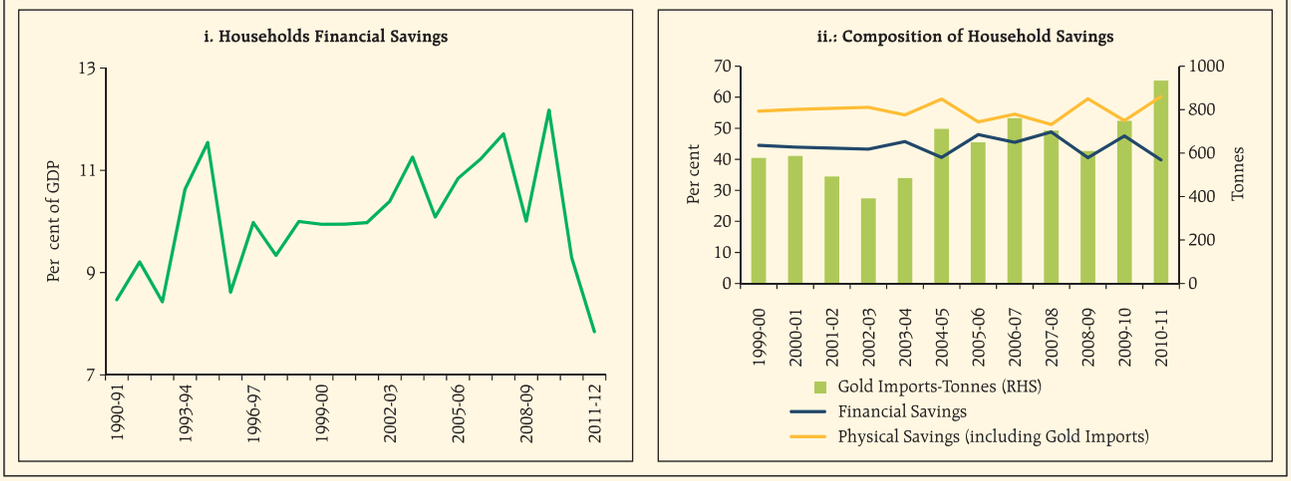
[7] Mohanty, Deepak (2012), "Perspectives on India's Balance of Payments", speech at the School of Management, KIIT University on December 07, 2012, Bhubaneswar.

Box 1.1: Household Physical and Financial Savings in India

Concerns have been raised over the fall in financial savings of households in the recent past. Financial savings of the household sector declined to a two decade low of 7.8 per cent of GDP in 2011-12 from 9.3 per cent in 2010-11 and 12.2 per cent in 2009-10 (Chart 1.14.i). Even in absolute terms, financial savings fell from `7.9 trillion in 2009-10 to `6.9 trillion in 2011-12. This has happened despite nominal GDP (at market prices) rising by more than 15 per cent during the period. Admittedly, households have been shifting away from financial assets into physical assets and valuables such as gold as evidenced by increase in gold imports (Chart 1.14.ii).

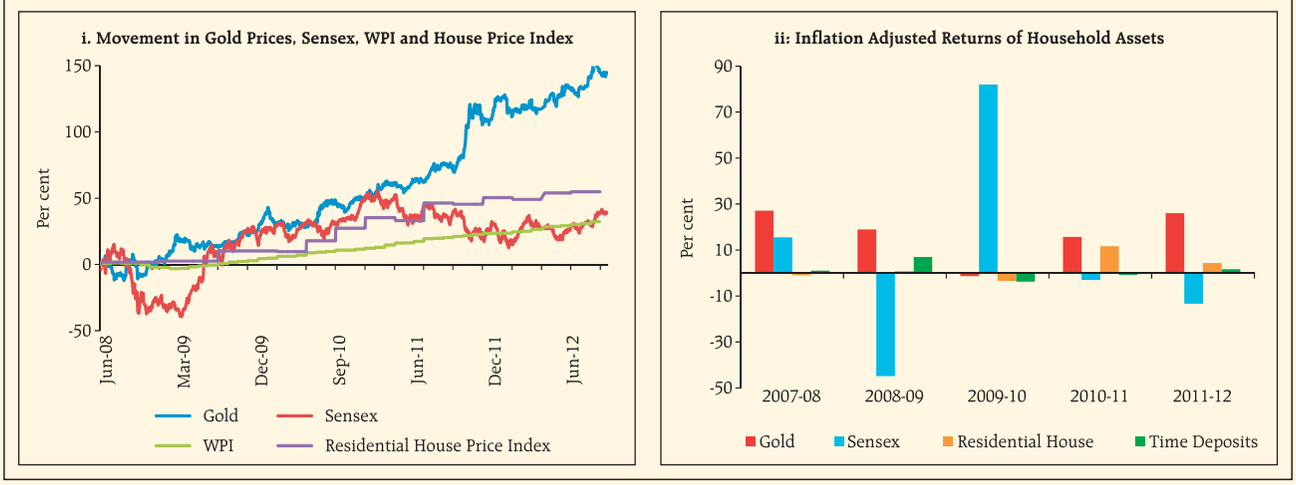
A number of possibilities could explain the fall in financial savings. Inflation has been high during the past few years. Consequently, real return on financial assets has been very low. Households seem to have shifted their savings from assets earning low real rates to assets perceived as inflation-proof. There has thus been a substitution towards non-financial assets like real estate and gold; the real returns on which have been relatively high (Chart 1.15). Chart 1.15.i depicts the movement in gold prices, BSE Sensex, residential house prices[8] and wholesale price index (WPI)[9]. Gold prices have increased the most in comparison with other assets and are

Chart 1.14: Household Savings



Note: Gold is accounted for as being part of "Valuables" in national accounts published by Central Statistics Office. However, in Chart 1.14.ii, entire import of gold has been included in physical savings to show the shift from financial to non-financial savings of households.
Source: RBI and World Gold Council

Chart 1.15: Movement in Prices of Household Assets



Note: Chart 1.15.i depicts percentage change over June 2008
Source: RBI Staff Calculations using data from GOI, Bloomberg, National Housing Bank (NHB), and RBI

(Contd....)

[8] Residential House Prices have been proxied by the NHB Residex
[9] Real rates fall further when adjusted against CPI which has been ruling higher than WPI.

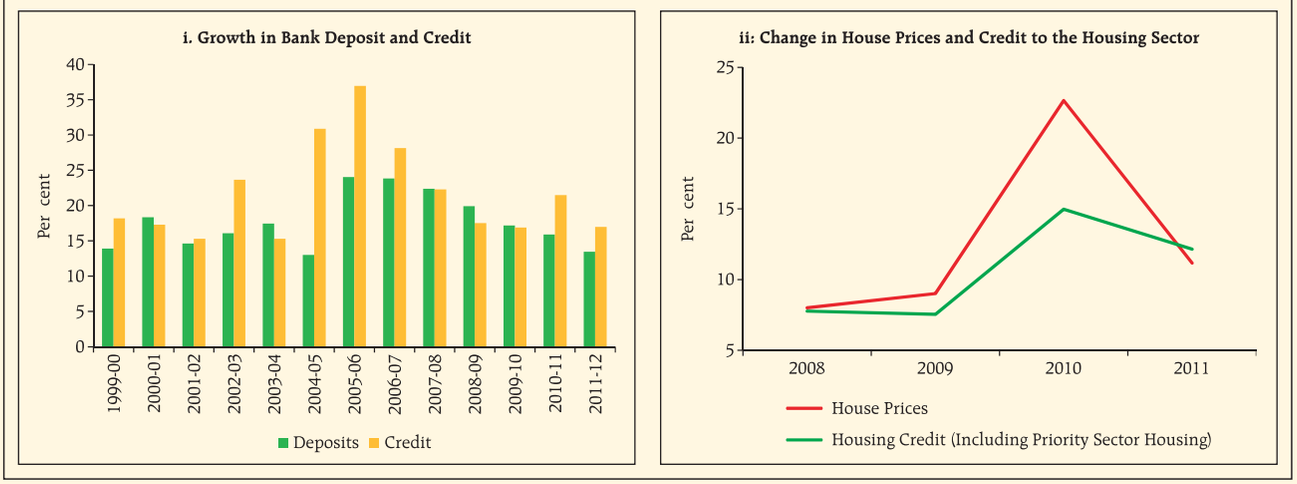
(....Concld.)

significantly above the movement in WPI as at end September 2012. Residential house prices have also beaten the upward movement in WPI. The movement in the BSE Sensex was only slightly higher than the WPI during June 2008 and September 2012. On a year-on-year basis, gold offered the highest returns among asset classes for majority of the years after the global financial crisis (Chart 1.15.ii). The price of gold carries an 'uncertainty premium' arising from risk aversion among investors in recent years. This has caused an above normal return that is not sustainable in the long term. Since Indian households hold a significant quantity of it, they face the risk of a correction in gold prices.

In addition to the higher real returns on gold and residential housing, other factors could be impacting the fall in financial savings and an increase in physical savings and valuables in household savings. Relatively easy availability of bank credit for housing and the commensurate rapid increase in bank credit during the early and mid 2000s has provided a fillip to house prices (Chart 1.16.i). House prices and bank credit to the housing sector support these trends (Chart 1.16.ii).[10]

Gold is easily accessible. It is a store of value, has no credit risk and is relatively liquid thereby incentivising many households to buy gold. Fall in financial savings has implications for capital formation as it channelises savings towards unproductive holding of gold. If gold supplants financial savings as a primary form of savings, it has stability implications for the financial sector.

Chart 1.16: Bank Credit and House Prices



Source: RBI and NHB

Credit Cycles in the Indian Economy

1.28 Given the importance of credit in boosting growth, there is a need for concerted policy action such that credit availability to the productive sectors of the economy is maintained/enhanced (Box 1.2).

1.29 The current slowdown in bank credit is also highlighted by the fact that its share in the total credit flow to the commercial sector has fallen. There appears to be a substitution of bank credit with non-bank domestic sources like Commercial Paper and foreign sources like External Commercial Borrowings and FDI.

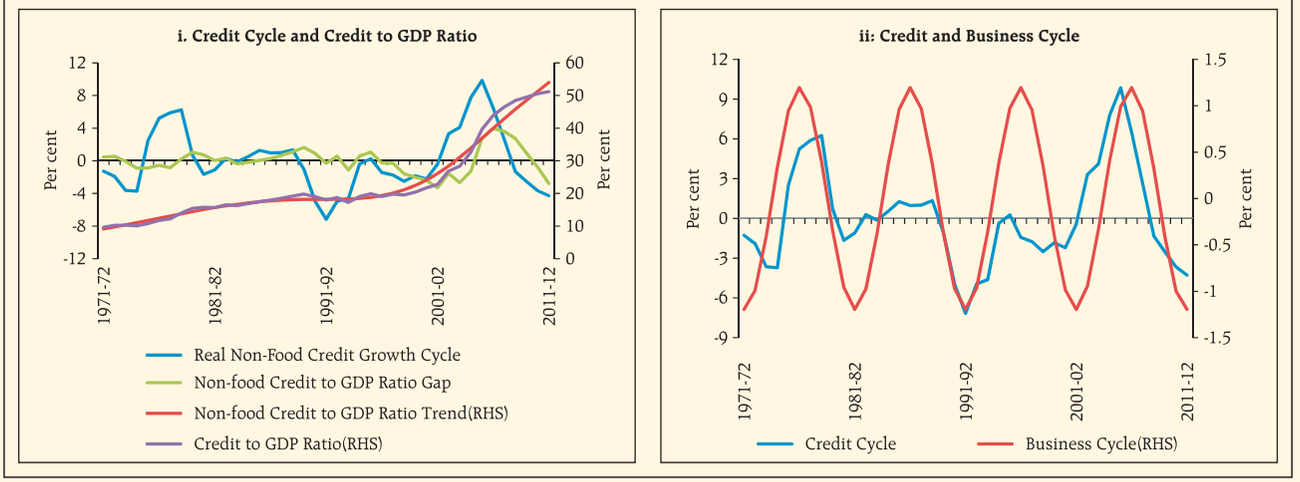
1.30 Immediately after the global financial crisis, US and European commercial banks deleveraged their balance sheet. Subsequently, the pursuit of accommodative monetary policies by advanced economies seems to have favoured capital flows back to emerging economies like India. The initial decrease followed by an increase in the proportion of foreign credit in the total flow of funds to the commercial

[10] Changes depict Y-o-Y growth at December end.

Box 1.2: Greater Credit Expansion Warranted as a Countercyclical Tailwind

The expansion phase of the credit growth cycle of the Indian banking system (scheduled commercial banks) started in 2002-03 and showed strong credit growth till 2005-06[11]. With the contraction phase setting in from 2007-08, the present phase of credit growth cycle seems to be heading towards a trough. At the current juncture, Credit to GDP Ratio Gap (the deviation of Non-Food GDP Ratio from its trend line, derived by the Hodrick-Prescott Filter) is negative (Chart 1.17). The multi-year low of the Credit to GDP Ratio Gap shows that the flow of credit to the commercial sector has been significantly lower than compared to its long term trend. This phenomenon therefore, calls for an increase in credit to counter the sharp downturn in the Indian economy. However, attention must be paid to the rising NPAs. Contrary to IMF's advice[12], the flow of credit to the productive sectors of the economy needs to be increased. The recent reductions in the statutory ratios have also augmented the resources available for lending.

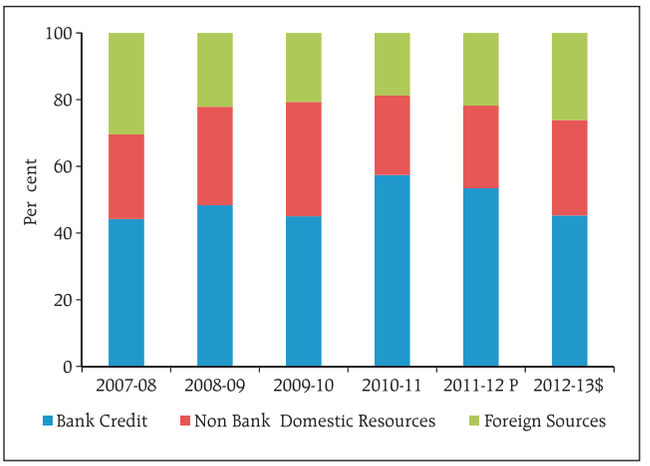
Chart 1.17: Credit Cycle[12] and GDP Growth



Source: RBI staff calculations

sector in India reflects these developments (Chart 1.18).

Chart 1.18: Composition of the Source of Credit to the Commercial Sector



Note: $ refers to April-October 5, 2012
Source: RBI

Capital Market Issuers - Composition

1.31 The mutual funds faced redemptions pushing the net resource mobilisation to the negative zone in 2011-12. Except for the gold exchange traded funds, balanced schemes and equity schemes other than Equity Linked Savings Schemes (ELSS), all other schemes faced sizable redemptions. The year was dominated by the non-convertible debenture issues of the public financial and infrastructure institutions. Proportion of long term funds raised by banks and financial institutions increased in 2011-12 to 73.5

[11] Credit Cycle is the cyclical component of real non-food credit growth, derived by Unobserved Component method (UCM) and Business Cycle is the cyclical component of real non-agriculture GDP growth, derived by UCM.

[12] The GFSR Market Update July 2012 noted that relative to other EMEs, large economies such as Brazil, China and India have benefited from strong credit growth in recent years, and are at the late stages of the credit cycle. Expanding credit significantly at the current juncture would heighten asset quality concerns and potentially undermine GDP growth and financial stability in the years ahead.

per cent from 25.5 per cent in 2010-11 (Chart 1.19). Together with non-bank firms, the financial sector's proportion of resources raised stood at 89.4 per cent in 2011-12 from 28.8 per cent in 2010-11. Financial sector's share in total number of issues increased from 23 per cent to 42 per cent during the period. This suggests that the capital market conditions are not enabling effective disintermediation in the financial system. Bank and non-bank firms, therefore, have to assume a larger role in resource allocation in the economy. For 2012-13 (April to November), however, the proportion of amount raised and number of issuances by the financial sector has dropped to 33 per cent and 29 per cent respectively.

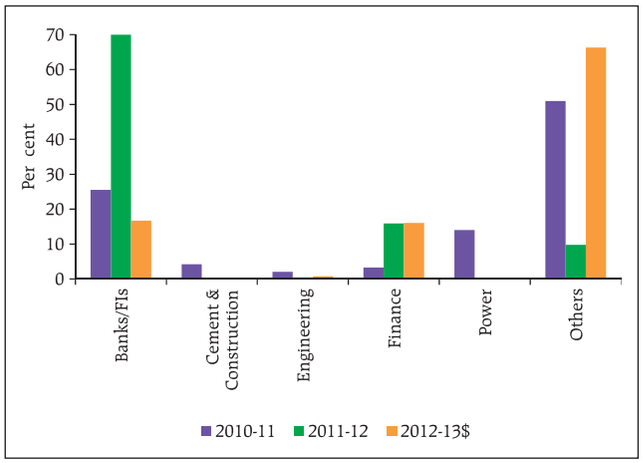
Primary Market in Equities

1.32 Primary market in equities remained subdued during 2011-12 on account of weak macroeconomic environment. Investment growth slackened with resource mobilisation by companies through Initial Public Offerings (IPOs) and Follow-on Public Offerings (FPOs) being substantially lower in 2011-12 when compared to the previous years (Chart 1.20). Negative returns from the previously listed IPOs and range bound equity markets dampened investor response for primary market issues. Issuers too refrained from resource mobilisation as the signs of slowdown in global and domestic economy became evident. While the amount raised through IPOs and FPOs was substantially lower during 2011-12 compared to previous years, the number and amount mobilised through public debt issues outstripped those of the earlier years. The recent activity witnessed in the IPO market for equities in 2012-13 is a welcome development, as long periods of weakness in primary capital markets can accentuate the trend of growing leverage in corporate sector (para 1.39).

Secondary Market in Equities

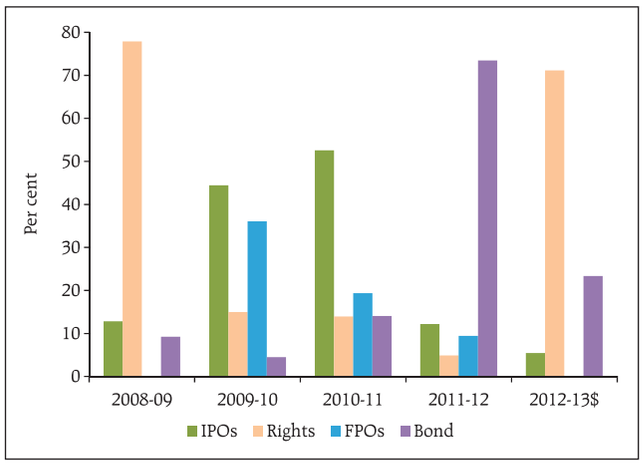
1.33 The Indian equity markets were volatile during 2012 and witnessed substantial FII inflows during 2012 (Chart 1.21). During 2012 (up to November 2012) domestic institutional investors (DIIs)[13] were net sellers while FIIs were net buyers in the equity markets (Chart 1.22). Behaviour of FIIs hinges critically on many domestic and external factors. Any adverse

Chart 1.19: Sector-wise Share in Resource Mobilisation



Note: $ refers to April-November
Source: SEBI

Chart 1.20: Share of Categories of Issues in Resource Mobilisation



Note: $ refers to April-October
Source: SEBI

[13] DIIs includes Bank, DFIs, Insurance Companies, New Pension Scheme and MFs

developments in the Euro area or on the unraveling of the US fiscal cliff issue could potentially lead to a sudden reversal of FII inflows from the Indian equity markets leading to a substantial correction in the indices. Domestic equity indices have rallied despite overall economic weakness on account of investor optimism about the renewed pace of reform measures announced by the government.

Erroneous Trades on Stock Exchanges

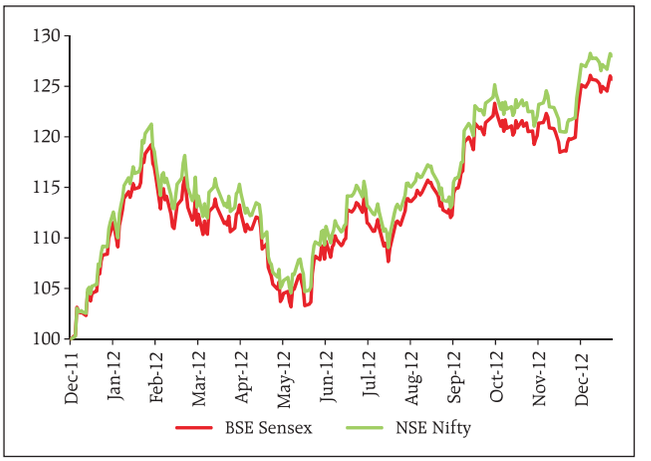
1.34 The previous Financial Stability Reports (FSRs) have highlighted the benefits and possible risk implications of adoption of various technological advancements *viz.* introduction of Direct Market Access (DMA), facilitating Algorithmic Trading and High Frequency Trading (HFT) in Indian securities market. However, not all trading disruptions can be attributed to HFT or algorithmic trading. There was a recent trading disruption at NSE on October 05, 2012 on account of erroneous order entry wherein non-algorithmic orders were entered for an erroneous quantity. This resulted in execution of trades at multiple price points across the entire order book, thereby causing the circuit filter to be triggered.

1.35 In cognizance of the disruptive effects of such trades, a number of measures have been put in place which include an upfront real-time risk management system for all exchange-based trading in the Indian securities market. The trading members are mandated to keep liquid assets with the clearing corporation and all margin obligations are deducted from the available liquid assets on a real-time basis. Further, it has been recently mandated that the terminals of the stock broker that are disabled upon exhaustion of collaterals shall be enabled only manually by the stock exchange, in accordance with its risk management procedures. In addition, other measures in relation to circuit breakers have been taken.

Corporate Sector

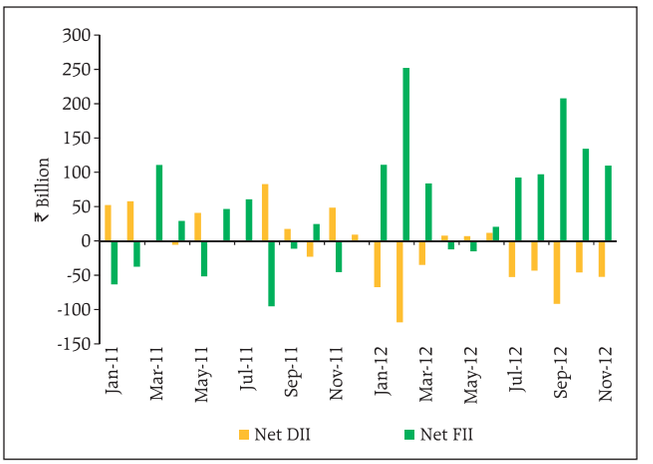
1.36 Performance of the corporate sector is of importance to financial stability, especially, given its link to overall economic growth in general, and its effect on bank asset quality in particular. Timely identification of risks emanating from this sector assists in designing measures to reduce the stress. An

Chart 1.21: Movment in Indian Equity Indices (Re-Indexed to End Decmber 2011 = 100)



Source: Bloomberg

Chart 1.22: DII and FII Net Inflows into Indian Equity Markets



Note: Data are provisional.
Source: BSE and SEBI.

analysis of the corporate sector shows that Profit Margin [EBITDA (Earnings Before Interest, Tax, Depreciation and Amortisation) to Sales] and return on assets [EBIT (Earnings Before Interest, Tax) to Total Net Assets] have recovered from the levels observed during the financial crisis in 2008-09 and indicate marginal improvement in 2011-12 as compared with 2010-11.[14] Total borrowing as percentage of equity has gradually declined over the years. The liquidity (measured by current assets to current liabilities ratio) at aggregate level remained stable in the range between 1.1 and 1.3. However, the Interest Coverage Ratio (ICR) which reflects the ability of corporates to service borrowing with present level of profits has fallen since 2009-10 and is currently below the levels of 2008-09.

1.37 Interest expenditure (as percentage of sales) at aggregate level fell significantly since 2001-02 to its lowest level of 2.3 per cent by 2005-06 and 2006-07. It has increased thereafter and has been at around 3 per cent of sales during 2008-09 to 2010-11. In 2011-12, however, the interest expenditure rose to 3.6, the highest level in the last nine years. Companies in the real estate sector had the highest interest burden in the last four years. Besides, interest burden in transport, storage and communications, construction, textiles, apparel and iron and steel industries are higher than in previous years and are increasing. Interest expense as percentage of total expenditure has also displayed similar trend and level in last 11 years. Leverage is higher for the industries such as iron and steel, construction, textiles, food products & beverages and apparel. Also, the borrowing to sales ratio indicates that profit margin of these industries will be most hurt in case of further increase in borrowing or interest rate. The distribution of companies as per their sales-size shows that the ICR has deteriorated in all companies but this deterioration has been more in the companies with lower sales. Further, leverage of companies in all size-groups, with a few exceptions, has generally improved. This improvement in leverage was more in the small sized companies in the terms of sales than the larger ones.

1.38 The ability to service borrowing (measured by EBIT to interest paid ratio) is not uniform across industries. In the manufacturing sector, during 2011-12 the ratio has fallen to the lowest level in last eight years indicating worsening of debt serviceability. The situation is similar in case of service sector also. In case of the transport, storage and communications industry, the ratio has continuously declined since 2006-07 and has fallen below one in 2011-12 indicating inability of this industry to cover the interest payment with EBIT. Effective interest cost (measured by interest expenses as percentage of average outstanding borrowing), was observed to have moved up in 2010-11. Industries paying higher effective interest cost are machineries – both electrical and non-electrical, food products and beverages, construction and textiles.

Corporate Leverage

1.39 The leverage for the corporate sector as a whole has declined over the past 11 years. An in-house analysis of 12 holding companies (where accounts of all subsidiaries carrying out various projects of the corporate group is consolidated) belonging to 8 large corporate groups[15] with high exposure to infrastructure sector was carried out. Eight out of 12 companies witnessed compound annual growth rate of over 30 per cent in debt over 2007-08- to 2011-12. For all these 12 companies taken together, the interest coverage has gone down, whereas their debt to EBITDA and debt to equity ratios have gone up during the last four years (Table 1.2). These corporates seem to be more vulnerable as compared to their counterparts in the same industry.

Table 1.2: Aggregated Ratios for 12 Select Companies from 8 Corporate Groups

(Per cent)

	2008-09	2009-10	2010-11	2011-12
Interest Coverage[16]	2.91	2.76	2.43	1.70
Debt to EBITDA[17]	6.96	7.32	7.24	9.46
Debt to Equity[18]	1.21	1.23	1.38	1.89

Source: ACE Equity

[14] Based on results of 2530 companies during 2011-12
[15] Large corporate groups with high exposure to infrastructure, particularly power were chosen for the purpose of the internal study.
[16] Interest Coverage Ratio = Σ EBIT$_i$/Σ Interest$_i$; i = 1, 2 ……12 (Companies)
[17] Debt to EBITDA Ratio = Σ Debt$_i$/Σ EBITDA$_i$; i = 1,2…....12 (Companies)
[18] Debt to Equity Ratio = Σ Debt$_i$/Σ Equity$_i$; i = 1,2 …...12 (Companies)

Systemic Risk Survey

1.40 The Systemic Risk Survey has been a useful tool to gauge the stability of the financial system from the perspective of all stake holders. The Survey was initiated by the Reserve Bank in October 2011 to capture the views of market participants and other stakeholders on the aggregate risks facing the financial system. The present Survey was conducted in October 2012.

1.41 The current survey indicates that global risk is the most important factor affecting the financial system. Among the global risks, the declining global growth, sovereign risk/contagion and global inflation/ commodity prices are prominent factors. Within the macro-economic risks, deterioration of the domestic outlook and increasing current account deficit are major highlights. The foreign exchange risk has also been highlighted. In the previous survey conducted in April 2012, market volatility was perceived as the most important risk facing the financial system. This was followed by asset quality, global and fiscal risks (Tables 1.3 and 1.4).

1.42 The respondents feel that there is a large probability of a high impact event occurring in the global financial system in the period ahead. On the high impact event occurring in the Indian financial system, the chances are medium. The stakeholders had medium level of confidence in the stability of

Table 1.3: Major Risk Groups identified in Systemic Risk Survey October 2012

A. Global Risks		↑
B. Macro-economic Risks		↓
C. Market Risks		↓
D. Institutional Risks		↔
E. General Risks		↔

Very high	High	Medium	Low	Very low

Change in risk since last survey

↑	↓	↔
Increase	Decrease	Same

Source: RBI, Systemic Risk Survey – October 2012

Table 1.4: Various Risks identified in Systemic Risk Survey October 2012

A. Global Risks	Global slow down	
	Sovereign Risk / Contagion	
	Funding Risk (External Borrowings)	
	Global Inflation / Commodity Price Risk (including crude oil prices)	
B. Macro-economic Risks	Deterioration in domestic economic outlook	
	Domestic Inflation	
	Current Account Deficit	
	Capital inflows/ outflows (Reversal of FIIs, Slow down in FDI)	
	Sovereign rating downgrade	
	Fiscal Risk (High Fiscal deficit)	
	Corporate Sector Risk (High Leverage/ Low Profitability)	
	Lack / Slow pace of Infrastructure development	
	Real Estate Prices	
	Political Risk	
C. Market Risks	Foreign Exchange Rate Risk	
	Equity Price Volatility	
	Funding Risk / Liquidity Risk/ Interest Rate Risk	
D. Institutional Risks	Regulatory Risk	
	Asset quality deterioration	
	Additional capital requirements of banks	
	Low credit off-take	
E. General Risks	Terrorism	
	Natural disaster	
	Social unrest (Increasing inequality)	

Very high	High	Medium	Low	Very low

Source: RBI, Systemic Risk Survey – October 2012

the global financial system. The view was that if the instability in the global financial system escalates in the next six months, it would affect the stability of the Indian economy (Table 1.5). However, the survey indicates that the participants had high confidence in the stability of the Indian financial system. Further, this perception has remained mostly unchanged during the past half-year (Chart 1.23).

Table 1.5: Perception on occurrence of high impact events and their impact on Indian financial system

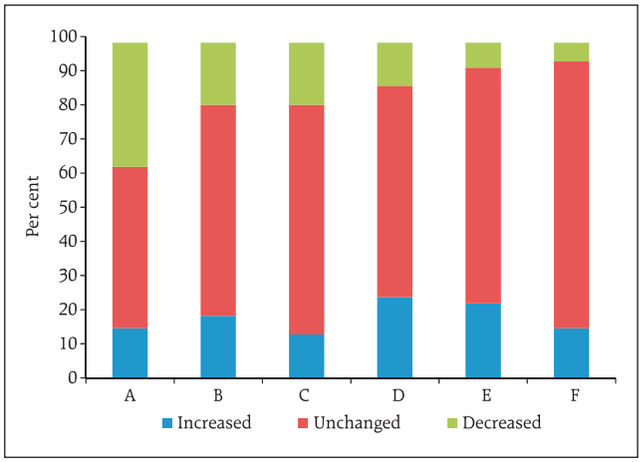
A : High impact event occurring in the global financial system in the period ahead (In Short Term : upto 1 year)	
B : High impact event occurring in the global financial system in the period ahead (In Medium Term : 1 to 3 years)	
C : High impact event occurring in the Indian financial system in the period ahead (In Short Term : upto 1 year)	
D : High impact event occurring in the Indian financial system in the period ahead (In Medium Term : 1 to 3 years)	
E : Confidence in the stability of the global financial system as a whole	
F : Expectation that instability in the global financial system, if it escalates in the next six months, would affect the stability of the Indian economy	
G : Confidence in the stability of the Indian financial system	

Note:

Risks					
A - D	Very high	High	Medium	Low	Very low
E &G	No confidence	Not very confident	Fairly confident	Very confident	Complete confidence
F	Affect significantly	Affect to a large extent	Affect somewhat	Affect to a limited extent	No impact

Source: RBI, Systemic Risk Survey – October 2012

Chart 1.23: Change in Perception over the past six months



Note: A : High impact event occurring in the global financial system in the period ahead (In Short Term : upto 1 year)
B : High impact event occurring in the global financial system in the period ahead (In Medium Term : 1 to 3 years)
C : High impact event occurring in the Indian financial system in the period ahead (In Short Term : upto 1 year)
D : High impact event occurring in the Indian financial system in the period ahead (In Medium Term : 1 to 3 years)
E : Confidence in the stability of the global financial system as a whole
F : Confidence in the stability of the Indian financial system

Source: RBI, Systemic Risk Survey – October 2012

Chapter II

Financial Institutions: Soundness and Resilience

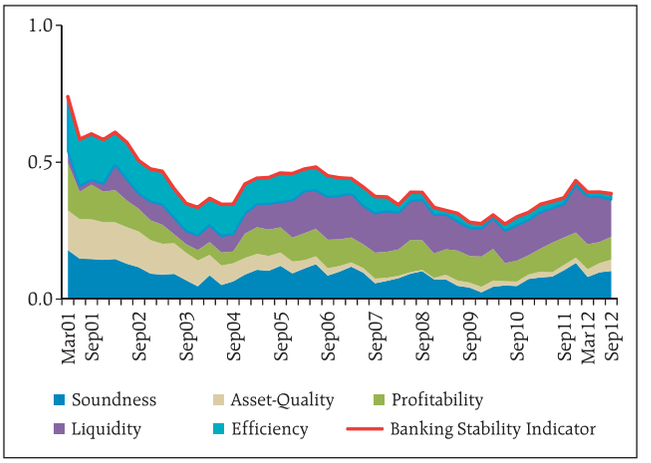
Commercial banks in India are well regulated. The Indian banking system has several inherent strengths, the most important being that the banks are well capitalised both in terms of quantity and quality of capital. Their funding structure is stable as they are largely reliant on domestic retail deposits. Their assets are well diversified and leverage is low. Despite these strengths, the Indian banking system faces certain headwinds. A slowing economy has raised the extent of delinquencies in a short period of time. However, profitability has been sustained in recent quarters. Deposit growth has lagged credit expansion for several quarters now and the composition of outside liabilities has been shifting toward big ticket short term deposits from corporate and high net worth individuals, exposing the banks to liquidity stress as it increases reliance on wholesale sources of funds. However, the resilience of the banking system to credit, interest rate, equity and foreign exchange shocks remain satisfactory.

The financial performance of non-banking financial companies and urban cooperative banks has been improving over the years and their leverage as well as maturity mismatches are being monitored. The inter-linkages among these diverse sectors of the financial system are strong implying that the interconnectedness of the domestic financial system will have to be closely monitored.

Risks to the Banking Sector

2.1 The risks to banking sector have been increasing in recent years. The Banking Stability Indicator[1] (Chart 2.1) suggests a continued deterioration in the stability of the banking sector since 2010 with the aggregate risks remaining at an elevated level during the year. An analysis of the components contributing to banking stability show that tight liquidity, deteriorating asset quality and reducing soundness are the major contributors to the decline in stability of the banking system. However, a marginal improvement in the indicator during the last two quarters is observed primarily because of better liquidity condition, due to regulatory prescriptions and enhanced profitability ratios, arising out of lower provisioning coverage (discussed in para 2.71).

Chart 2.1: Banking Stability Indicator and its Components



Note: Increase in indicator value shows lower stability
Source: RBI Supervisory Returns and Staff Calculations

2.2 The Banking Stability Map, which reflects the relative changes in the vulnerabilities since the previous FSR, further reveals that the asset quality and soundness indicators have deteriorated *vis-à-vis* their position in March 2012, while the liquidity indicators show some improvement as at the end of September 2012, the

[1] Methodology is described in the Annex.

profitability indicators in the current quarter, though better than March 2012, show marginal deterioration as compare to June 2012 (Chart 2.2).

Distress Dependencies and Inter-connectedness - An Analysis

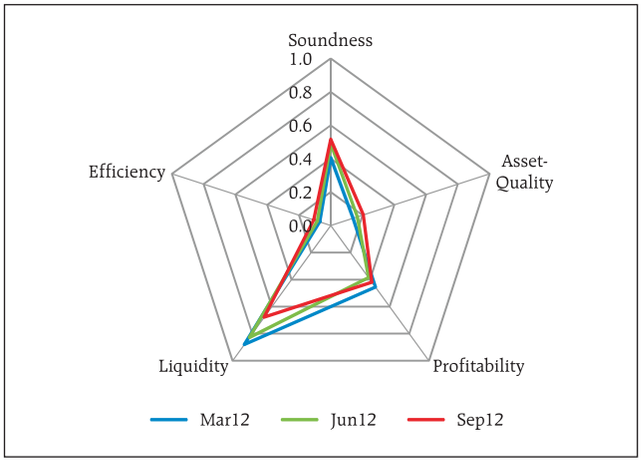
Banking Stability Measures (BSMs)

2.3 The FSR has been publishing the Banking Stability Measures since June 2011. These measures take into account distress dependence among the banks in a system, thereby providing a set of tools to measure (i) common distress of the banks in a system, (ii) distress between specific banks, and (iii) distress in the system associated with a specific bank. These distress dependencies are modelled by conceptualising the financial system as a portfolio of a specific group of banks (Segoviano and Goodhart, 2009). In particular, the Banking System's Portfolio Multivariate Density (BSMD)[2], which characterises both the individual and joint asset value movements of the portfolio of banks, is estimated from Probabilities of Distress (PoDs)[3] of the banks[4], observed empirically based on 99 per cent Value at Risk (VaR) of daily banks' equity price return. The BSMD embeds the banks' distress inter-dependence structure that captures linear and non-linear distress dependencies among the banks in the system and its changes at different times of the economic cycle. During times of distress, the financial position of banks worsens concurrently through direct or indirect links with the economy and markets on account of fall in asset values, interbank lending and information asymmetries. The banking stability measures show early signs of easing in distress-dependencies among banks.

Common distress in the system: JPoD and BSI

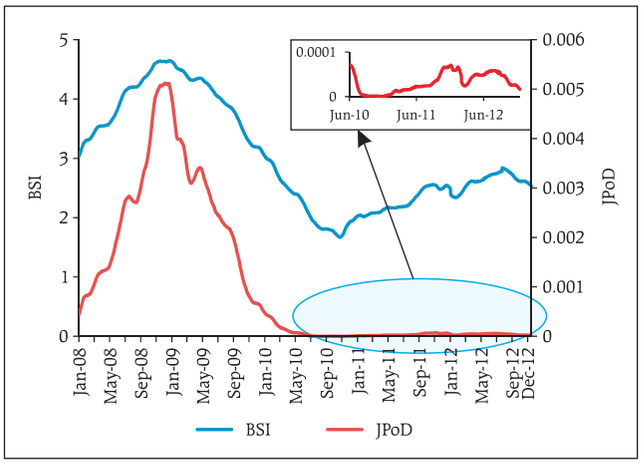
2.4 The probability of distress of the entire banking system, as measured by Joint Probability of Distress (JPoD) seems to have reversed its upward trend and registered a marginal decline in the recent period (since November 2012). The Banking Stability Index (BSI),

Chart 2.2: Banking Stability Map



Note: Away from the centre signifies increase in risk
Source: RBI Supervisory Returns and Staff Calculations

Chart 2.3: Movements of JPoD and BSI



Source: RBI Staff Calculations

[2] Details are in FSR-June 2011.

[3] This methodology also offers great flexibility for implementation, since the PoDs of individual bank represent the input variables, which can be estimated using alternative approaches. The PoDs for banks were estimated from their equity return distributions. Under this approach, first, banks' historical distributions of equity returns are estimated. Then, the probability of returns falling under the historical worse 1 per cent of the cases (99 VaR) is quantified. Therefore, the PoD of a specific bank represents the probability that the bank's equity return would fall in the tail region (historical one percentile).

[4] For the study 15 major banks have been selected for which equity price data are available. These represent about 60 per cent of total assets of scheduled commercial banks.

which measures the expected number of banks which could become distressed given that at least one bank becomes distressed also registered a similar movement of JPoD (Chart 2.3).

Distress between specific banks: Toxicity and Vulnerability Indices

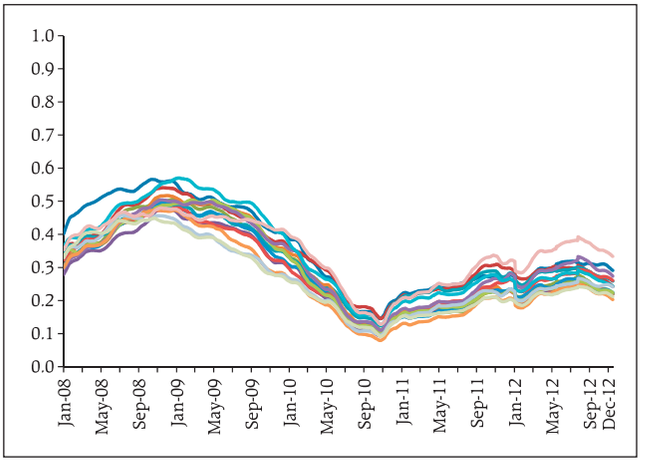
2.5 The distress between specific banks is measured by Toxicity and Vulnerability Indices. The Toxicity Index (TI) is the average probability that a bank under distress may cause distress to another bank in the system. Toxicity of banks, which was rising since beginning of 2010, has shown some decline since October 2012. At present, the TI of the selected banks is hovering around 0.25 (Chart 2.4).

2.6 Vulnerability Index (VI), which quantifies the average probability of a bank being in distress given distress in the other banks in the system, was high during the recent financial crisis. The highest probability was about 0.9 per cent during the crisis, which declined significantly to close to zero. During the recent period, the VI of the selected banks is hovering around 0.15 (Chart 2.5).

Distress in the system associated with a specific bank: Cascade Effect

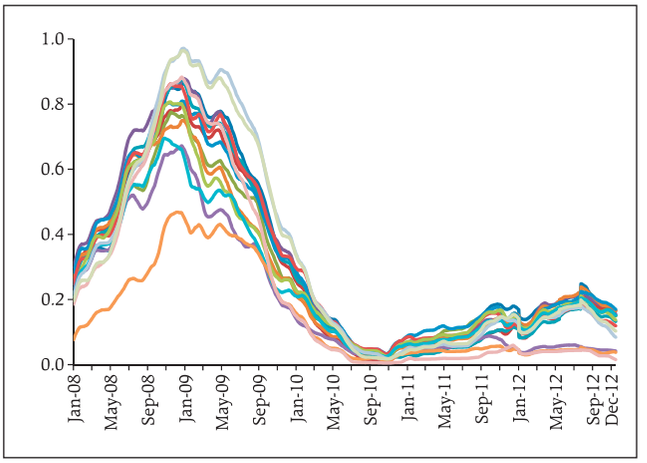
2.7 The probability that at least one bank becomes distressed, given that a specific bank becomes distressed, characterises the likelihood that one or more banks, in the system become distressed. This measure quantifies the potential 'cascade' effects in the system given distress in a specific bank, which reflects the systemic importance of a specific bank. Though these conditional probabilities do not imply causation; these can provide important insights into systemic inter-linkages among the banks comprising the system. The cascade probabilities show that the Indian banking system is highly interlinked and had a high distress dependency during the financial crisis period. The effect came was down in 2010, but shows an increasing trend since beginning of 2011 (Chart 2.6).

Chart 2.4: Movement of Toxicity Index of Select Banks



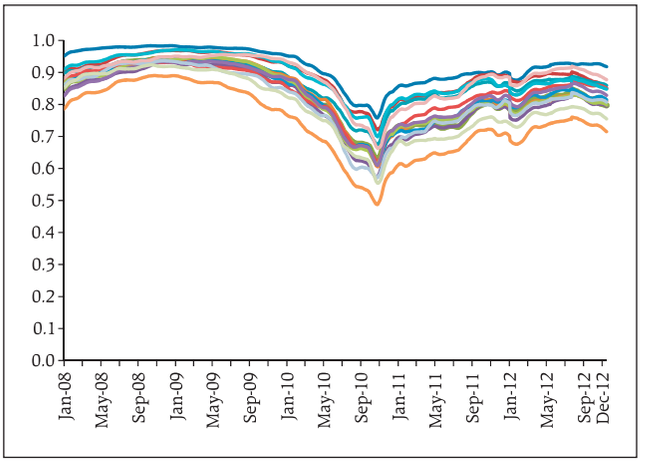
Source: RBI Staff Calculations

Chart 2.5: Movement of Vulnerability Index of Select Banks



Source: RBI Staff Calculations

Chart 2.6: Systemic Inter-linkages among Select Banks: Cascade Effect



Source: RBI Staff Calculations

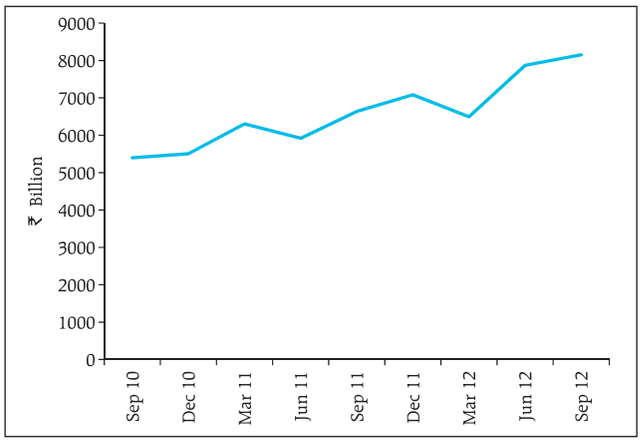
Network Analysis

2.8 The tools of network analysis are used to assess the interconnectedness in the financial sector and the contagion risks arising from the failure of one or more financial institutions[5]. The analysis finds that the inter linkages in the Indian financial system are strong. In the event of failure of a financial institution, risks are posed to other financial institutions which have exposures to the failing institutions. Entities which have lent to the failing institution face solvency risks while entities which have borrowed from the failing institution face liquidity risks. The greater the degree of interconnectedness in the financial system, higher is the risk of contagion posed by a failing financial institution. These risks are being monitored on a quarterly basis and have not changed significantly over the last two years.

2.9 The Indian interbank market has grown consistently over the last two years (Chart 2.7). The public sector banks continue to have the largest share in this market (Table 2.1).

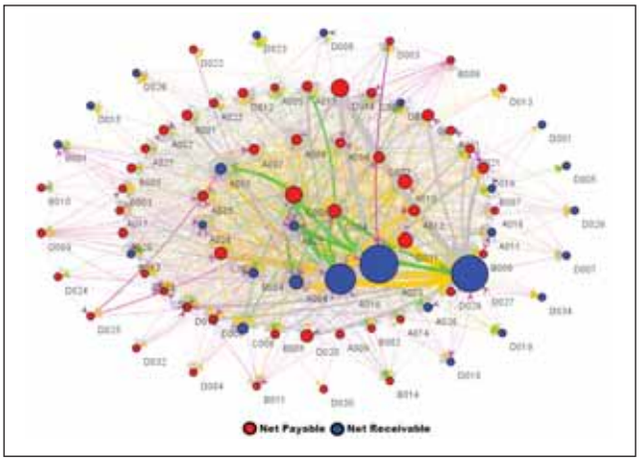
2.10 The network of the banking system continued to display a distinct tiered structure. Three to four banks have consistently featured in the inner core over the last two years (September 2010 to September 2012), of which, two banks are large net borrowers. The network of the entire financial system also remained tiered (Charts 2.8 and 2.9).

Chart 2.7: Size of the Interbank Market



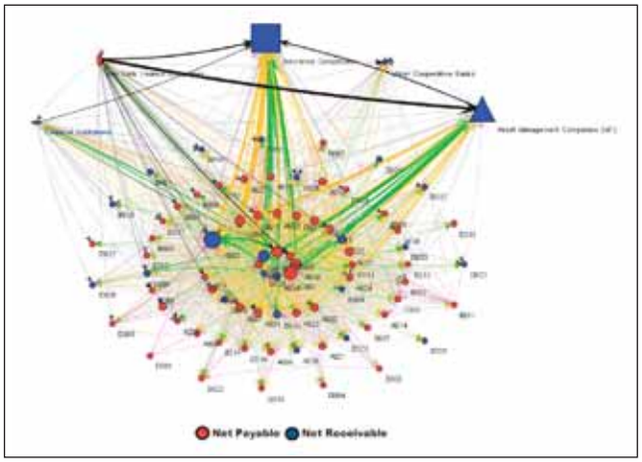
Source: RBI

Chart 2.8: Network of the Banking System – September 2012



Source: RBI

Chart 2.9: Network of the Financial System – June 2012



Source: RBI, SEBI, IRDA

Table 2.1: Share in the Interbank Market[6] (%)

	Sep 2011	Sep 2012
Public Sector Banks	53.3	55.9
Old Private Banks	5.4	2.9
New Private Banks	17.8	15.5
Foreign Banks	23.5	25.7

Source: RBI

[5] The network analysis has been conducted based on data in respect of bilateral fund based and non-fund based exposures between banks, asset management companies, insurance companies, NBFCs, financial institutions and urban cooperative banks. The transactions where the settlement takes place through a central counterparty have not been reckoned. The Network model used in the analysis has been developed by Professor Sheri Markose (University of Essex) and Dr. Simone Giansante (Bath University) in collaboration with the Financial Stability Unit, Reserve Bank of India.

[6] Market share is computed as (Lending plus borrowing)/(total lending + total borrowing)

Risks of Contagion

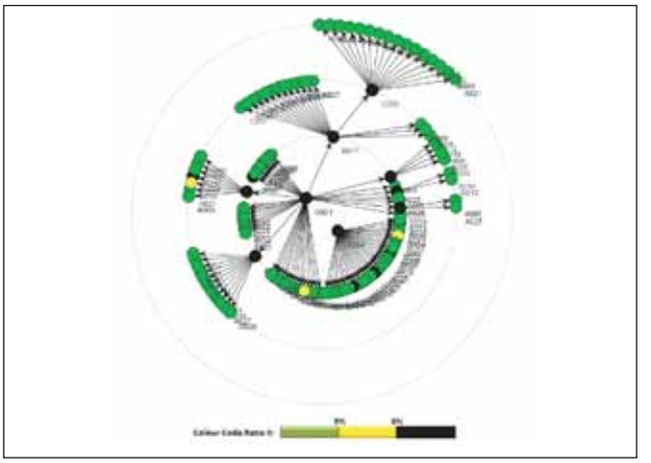
2.11 The previous paragraph referred to two large borrower banks which have remained in the inner core of the network of the banking system consistently over the last two years. An assessment of the contagion impact of the simultaneous failure of these banks indicate that they would trigger the failure of nine other banks and result in a loss of over 18 per cent of the Tier 1 capital of the banking system (Chart 2.10).

2.12 An analysis of the potential contagion loss which could be caused by the ten most connected banks on different dates between September 2010 and September 2012 showed that the maximum loss caused by the failure of any one of the above banks ranged between 7 per cent and 17 per cent of the total Tier 1 capital funds of the banking system. The analysis further showed that the bank causing the maximum contagion loss remained the same over the period. The average loss to the Tier 1 capital funds of the banking system caused by the failure of any one of the 10 banks ranged from about 4 per cent to over 7 per cent with a peak loss of 7.3 per cent in December 2010. These trends indicate that the interconnectedness of the banking system of the country will need to be continuously monitored (Chart 2.11).

Contagion risks for different levels of loss given default [9]

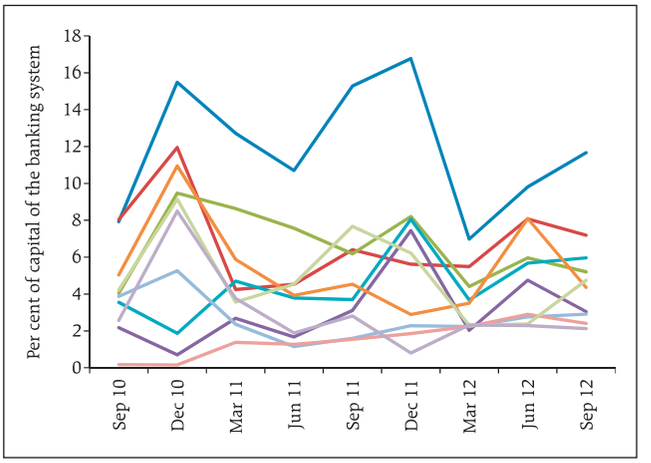
2.13 The contagion analysis conducted so far (in previous paragraphs and in earlier FSRs) has taken into consideration netted bilateral exposures between banks. Ideally, such analysis should consider gross exposures multiplied by the loss given default (LGD) which will give the exact amount of the loss incurred by a creditor bank due to the failure of the debtor bank. LGDs vary between 100 per cent (equivalent to a zero recovery rate for the creditor) and 0 per cent (in the event that an exposure is fully collateralised and there is no loss to the creditor).

Chart 2.10: Contagion Impact of the Failure of Two Large Borrower Banks in the Inner Core of the Banking System[7]



Source: RBI

Chart 2.11: Loss of Capital of the Banking System due to the Failure of Top 10 Connected Banks[8]



Note: Each line in the chart represents the percentage loss of Tier 1 capital of the banking system due to the failure of a particular bank
Source: RBI Staff Calculations

[7] Distress conditions are based on the capital adequacy ratio of banks. The colour coding used in the contagion chart is as follows;
Black: Trigger and distressed institutions.
Institutions which are affected but not distressed:
(i) **Green**: Institutions which are affected by the failure of the trigger/distressed institution but which are able to absorb the shock.
(ii) **Yellow**: Banks which are affected by the failure of the trigger/distressed banks and whose capital adequacy falls below 9 per cent but which do not become distressed, hence do not spread further contagion.

[8] For the purpose of this analysis, the 10 banks with the highest eigenvector centrality (*i.e.* banks which are most connected) as on September 30, 2012 have been considered. Refer Box 5.1 in the Financial Stability Report, June 2012 for the eigenvector measure of centrality.

[9] LGD is defined as a bank's economic loss upon the default of a debtor/borrower.

2.14 However, information about recovery rates and associated LGDs are not readily available. LGD depends, among others, on the type and amount of collateral as well as the type of borrower and the expected proceeds from the work out (*e.g.* proceeds from sale of collateral/ securities) of the assets. Also, LGD is exposure specific *i.e.*, different exposures to the same borrower may have different LGDs. In the Indian context, the information gaps are further accentuated by the fact that bankruptcy laws are not clear and because there have been no major instances of bank failures to provide empirical guidance on potential LGDs.

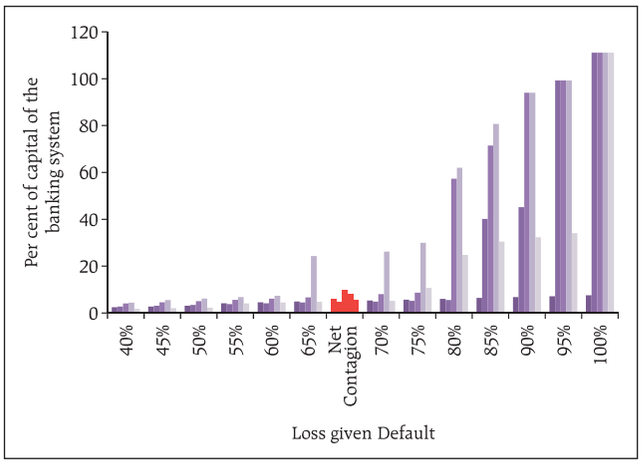
2.15 An assessment of contagion losses caused by the five most connected banks (as on September 30, 2012) for different levels of LGDs indicates that below a certain threshold (60 per cent), contagion losses are very low. Beyond that threshold, however, contagion losses increase sharply (Chart 2.12).

2.16 Guidelines issued by the Reserve Bank for the implementation of the internal rating based (IRB) approaches for calculation of capital charge for credit risk[10] indicate an LGD of 65 per cent and 75 per cent for unsecured and non-recognised collateralised exposures, respectively, (based on their seniority) for banks migrating to the foundation IRB approach. Banks which seek to migrate to the advanced IRB approach will need to provide their own estimates of LGDs. As banks migrate to the IRB approaches, assessment of LGDs can be expected to improve leading to more precise assessment of contagion risks.

Impact of distress conditions in the banking system on contagion risks

2.17 The contagion impact of the failure of a bank is likely to be magnified if the failure takes place in a situation of generalised distress or shock to the banking system. To assess the impact of distress conditions on contagion risks, four different shocks relating to interest rate and foreign exchange risks were considered (the shocks used are the same as those used for stress testing the derivatives portfolio of banks, as described in paras 2.67 and 2.68).

Chart 2.12: Loss of Capital of the Banking System due to the Failure of Five Most Connected Banks at Different Levels of LGD



Source: RBI Staff Calculations

[10] http://www.rbi.org.in/scripts/NotificationUser.aspx?Id=6887&Mode=0

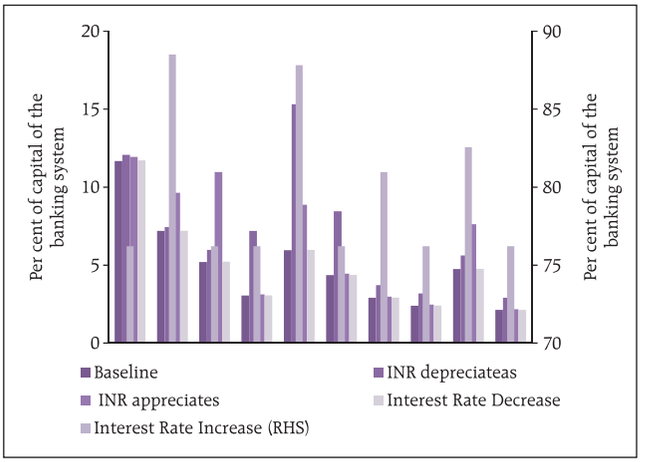
2.18 The sensitivity analysis was conducted for both the balance sheet and the derivatives portfolio of banks. The impact of the market movements on capital was factored in before assessing the contagion loss. The exercise revealed that movements in the US$/INR exchange rate in both directions increased contagion losses. In case of interest rate shocks, a reduction in interest rate did not have any impact on contagion losses. The impact on contagion loss was maximum in case of a sharp increase in interest rates (Table 2.2 and Chart 2.13).

Table 2.2: Impact of Distress Conditions on Contagion Loss

Scenario	Percentage loss in capital of the banking system due to the failure of the top ten connected banks	
	Average Loss (%)	Maximum Loss (%)
Baseline	5.0	11.7
INR depreciates	7.2	15.3
INR appreciates	6.4	11.9
Interest Rate Increase	79.7	88.5
Interest Rate Decrease	5.0	11.7

Source: RBI Staff Calculations

Chart 2.13: Loss of Capital of the Banking System due to the Failure of Top 10 Connected Banks under Different Distress Conditions



Source: RBI Staff Calculations

Liquidity contagion using network analysis

2.19 The financial crisis highlighted the importance of sound liquidity risk management by banks and other financial institutions and the need to address systemic liquidity risk. It highlighted the fact that failure of one or more institutions could result in multiple institutions facing simultaneous difficulties in rolling over their short-term debts or in obtaining new short-term funding. The network model can be used to capture the contagion risks posed to the liquidity of the banking system in case of failure of a large lender.

2.20 Failure of a bank affects both its lenders and borrowers leading to solvency risk, on the one hand, and liquidity risk, on the other. Liquidity risk is posed to the banks who have borrowed funds from the failing bank as these banks will need to replace the funds borrowed.

2.21 A bank will typically maintain liquidity buffers to tide over emergencies. These buffers comprise excess CRR and SLR securities. The bank can also access un-availed standing facilities extended to it by the central bank. If these funds are not sufficient, the bank may be able to call in short term lending to its counterparties. In the eventuality that the bank's liquidity buffers and callable assets are not sufficient to meet the liquidity shock caused by the failing bank, the bank itself may have to be liquidated. If the borrower bank is forced to call back its short term lending, the bank may itself transmit a liquidity shock to its borrowers, who will, in turn, need to find alternative funding sources. This iterative process continues till no further loans need to

be called back and hence no shock is transmitted. This process is illustrated in the Chart 2.14.

2.22 An assessment of the impact of the liquidity contagion in the Indian banking system indicates that the failure of the large lenders in the system could have a significant downstream impact on the availability of liquidity in the system and could also cause a few other banks to be, in turn, liquidated (Table 2.3). The impact is alleviated to some extent if banks are in a position to call in short term interbank loans.

2.23 The liquidity contagion caused by the failure of the largest lender bank in the system as on June 30, 2012 is represented in a stylised chart (Chart 2.15). The black triangle in the centre represents the lender bank which is liquidated for some exogenous reason. Banks which have borrowed from the liquidated bank will need to replace these borrowings. In some cases, the liquidity buffers of the banks are sufficient to absorb the liquidity shock (banks represented by green triangles). In some other cases, banks survive by using their buffers and calling in short term inter-bank loans (banks represented by orange triangles). These banks will, however, also propagate the liquidity shock in the process of calling in loans. For some banks, the buffers and short term inter-bank loans will not be sufficient to replace the funds borrowed from the trigger bank. These banks will, in turn, be liquidated (banks represented by black triangles) and will restart the next round of liquidity contagion. The contagion stops when no further banks are liquidated.

Linkages between Banking and Non-Banking Sectors

2.24 As is the case globally, the financial system in India is also interconnected. Both funding dependencies and direct credit exposures exist between banks, on the one hand, and insurance companies, mutual funds and non-banking financial companies (NBFCs), on the other. While the banking sector is a net lender to the NBFC sector, it is a net borrower *vis-à-vis* the insurance companies and asset management companies (AMCs) (Charts 2.16 and 2.17).

Chart 2.14: Flowchart Representing the Propagation of a Liquidity Contagion[11]

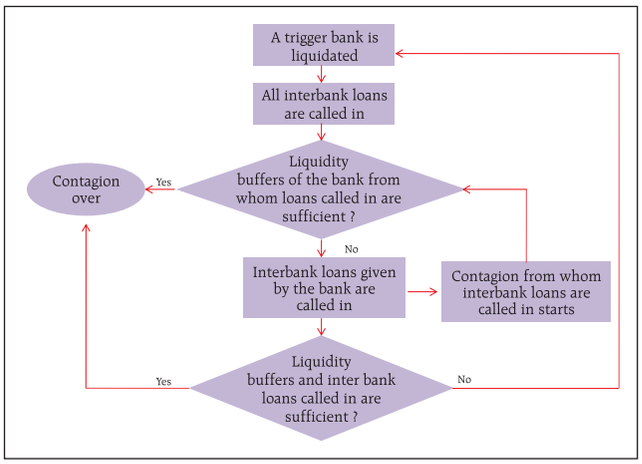


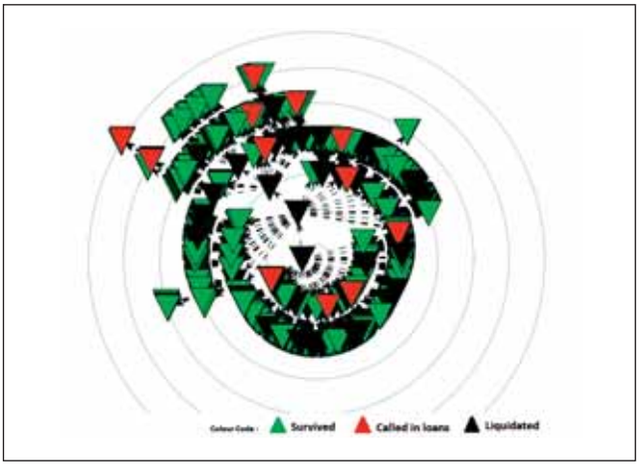
Table 2.3: Impact on Availability of Systemic Liquidity due to the Failure of a Large Lender Bank

(Per cent)

	Impact
Bank 1	82
Bank 2	42
Bank 3	36
Bank 4	31
Bank 5	33

Note: The impact of availability of systemic liquidity is measured as a percentage of the total liquidity buffers of all SCBs as on given date
Source: RBI Staff Calculations

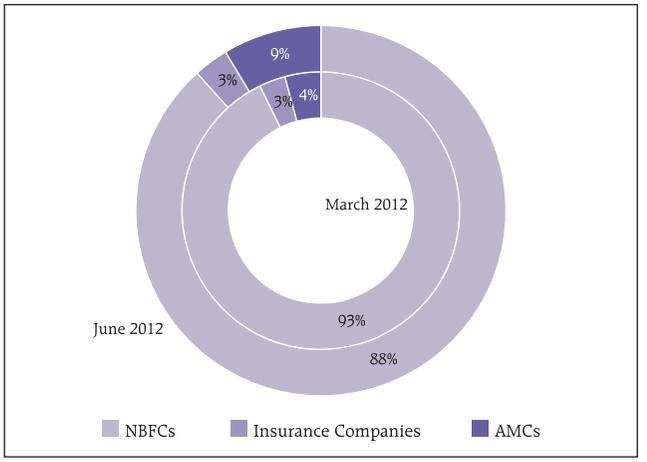
Chart 2.15: Liquidity Contagion due to the Failure of a Large Lender Bank



Source: RBI Staff Calculations

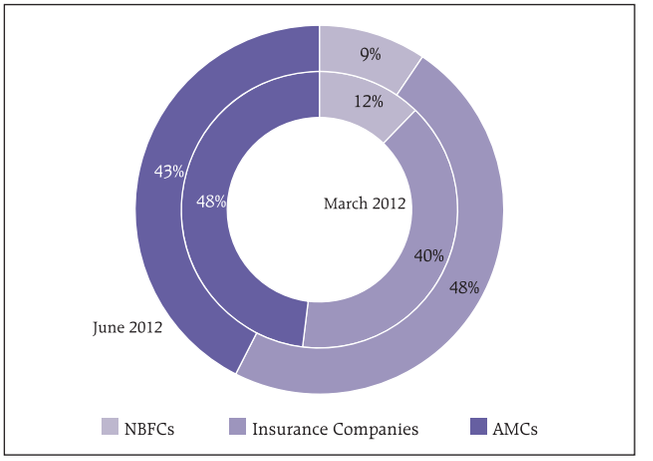
[11] The analysis is conducted on gross exposures between banks. The exposures include the fund based and derivative exposures. The assumption used is that when a bank is liquidated, the funds lent by the bank are called in on a gross basis, whereas when a bank calls in a short term loan without being liquidated, the loan is called in on a net basis (on the assumption that the counterparty is likely to first reduce its short term lending against the same counterparty).

Chart 2.16: SCBs' Lending to Non-bank Financial Entities



Source: RBI Staff Calculations

Chart 2.17: SCBs' Borrowing from Non-bank Financial Entities



Source: RBI Staff Calculations

2.25 The average banking sector exposure to NBFCs as a percentage of capital funds stood at 18 per cent as at end June 2012. However, the exposures were significant in the case of a few banks with the exposure of 5 banks (comprising 8.7 per cent of banking sector assets) to NBFCs being in excess of 50 per cent of their capital funds (Chart 2.18).

2.26 Insurance Companies are also interconnected with the banking system as major lenders to banks which means that insurance companies could be adversely affected in case of any major distress in the banking sector (Chart 2.19).

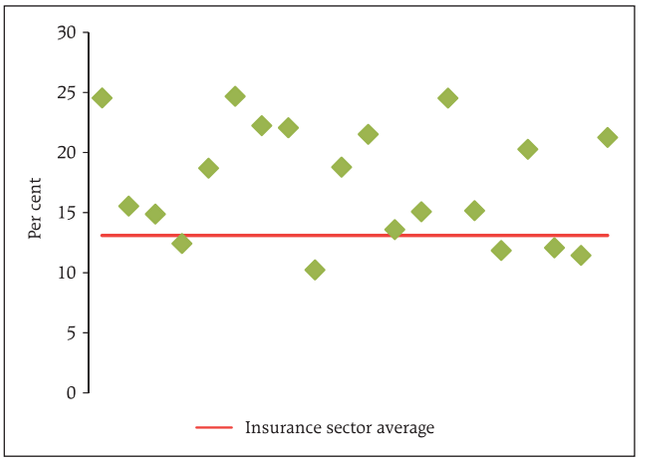
2.27 The NBFC sector was significantly dependant on the banking system for their funding needs[12]. For the selected sample, on an average, borrowings from SCBs comprised over 100 per cent of the capital funds for the NBFC sector. The dependency was higher in case of a few companies for which the ratio was in excess of 200 per cent.

2.28 Some outlier banks were significantly dependent on mutual funds for their funding needs though for the banking sector on an average, borrowings from mutual funds constituted only about 20 per cent of their capital funds. However, as discussed in the previous FSR, the borrowing of banks from mutual funds was primarily short term which could leave the banks with a potential liquidity risk in case of any stress in the mutual fund industry (Chart 2.20).

Chart 2.18: Exposure of Banks to NBFCs as a percentage of Capital Funds

Source: RBI Staff Calculations

Chart 2.19: Exposure of Insurance Companies to SCBs as per cent of Policy Holders' Liabilities



Source: IRDA

[12] The analysis is based on a sample size of around 30 large NBFCs

Soundness and Resilience

Scheduled Commercial Banks (SCBs)

Balance Sheet Size and Structure

2.29 Total bank credit grew at 15.9 per cent, while total deposits growth was 14.3 per cent as at end September 2012 (Y-o-Y). Despite faster credit growth relative to deposit expansion, the Credit-Deposit (C-D) ratio has declined to 74.4 per cent as at end September 2012 from 76.0 per cent as at end March 2012. The incremental C-D ratio has also declined during the half year since March 2012, indicating the trend that banks have deployed a greater share of incremental deposits in investments and other assets.

2.30 The steepest fall in growth rate of gross advances (y-o-y) as at end-September 2012 from the previous quarter was for the foreign banks; from 17.3 per cent to 6.5 per cent, followed by old private sector banks from 23.1 per cent to 18.6 per cent. There was moderate fall in the growth rate of advances for the public sector banks to 15.0 per cent, while the new private sector banks had a slight increase in the growth rate of advances at 22.7 per cent (Chart 2.21).

Capital to risk weighted assets ratio (CRAR)

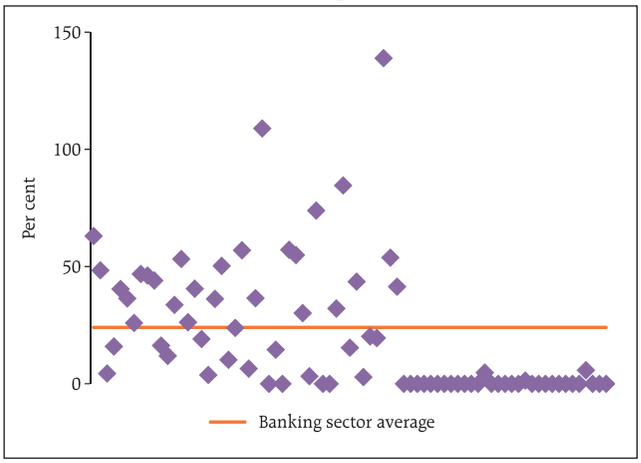
2.31 The overall capital adequacy ratio (CRAR) has deteriorated since March 2012 though it remained well above the regulatory minimum. The decline in CRAR was observed to be more pronounced for the public sector banks (Chart 2.22). The growth in risk weighted assets of the foreign banks was lower over the period under reference, partly explaining the improvement in their CRAR position (Chart 2.23).

Credit risk

Asset Quality

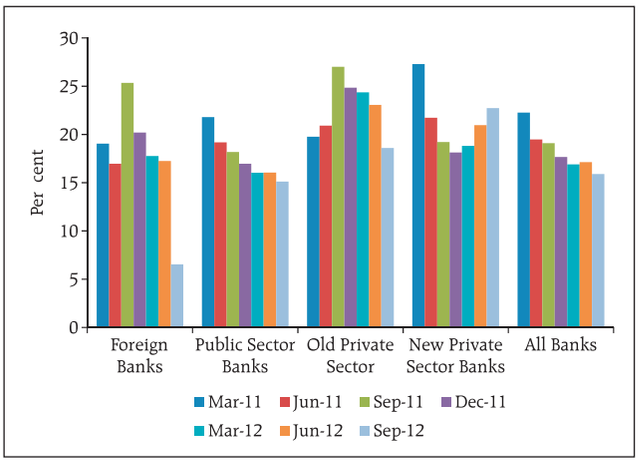
2.32 The asset quality of banks has seen considerable deterioration during the half year ended September 2012. Gross non-performing advances (GNPA) ratio for all banks rose sharply to 3.6 per cent as at end September 2012 from 2.9 per cent as at end March 2012. Net NPA ratio stood at 1.7 per cent as at end September 2012, as against 1.2 per cent as at end March 2012. Among the

Chart 2.20: Borrowing of Banks from AMCs as per cent of their Total Capital



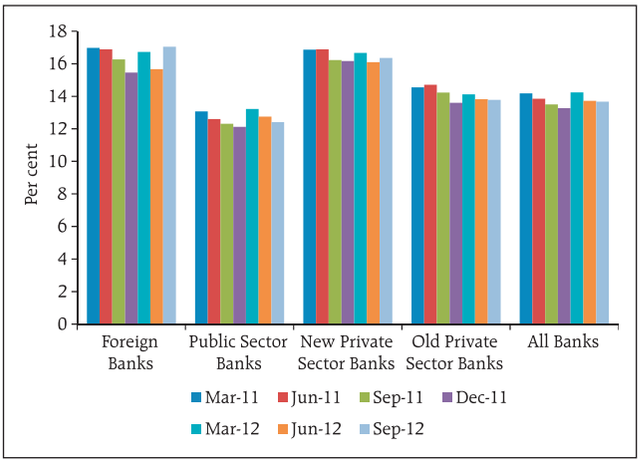
Source: RBI Staff Calculations

Chart 2.21: Growth Rate in Advances of Bank Groups



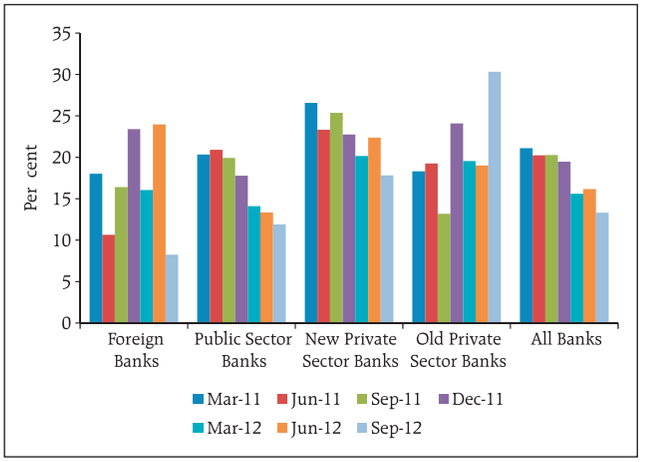
Source: RBI Supervisory Returns

Chart 2.22: CRAR - Bank-groups



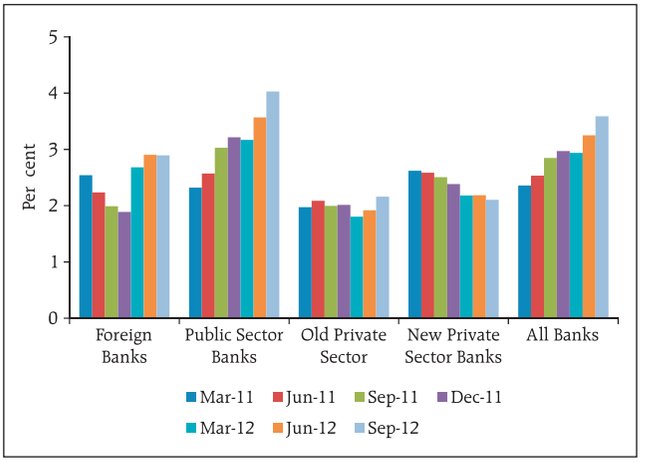
Source: RBI Supervisory Returns

Chart 2.23: Growth in Risk Weighted Assets - Bank Groups



Source: RBI Supervisory Returns

Chart 2.24: Gross NPA Ratio



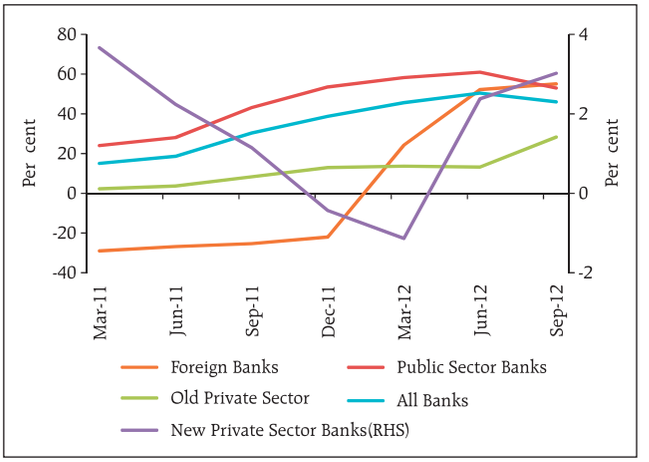
Source: RBI Supervisory Returns

bank groups, the public sector banks witnessed a high degree of deterioration in asset quality (Chart 2.24).

2.33 The growth rate of GNPAs at 45.7 per cent (y-o-y) as at end September 2012 outpaced that of gross advances during same period, highlighting the rising concerns on asset quality (Chart 2.25).

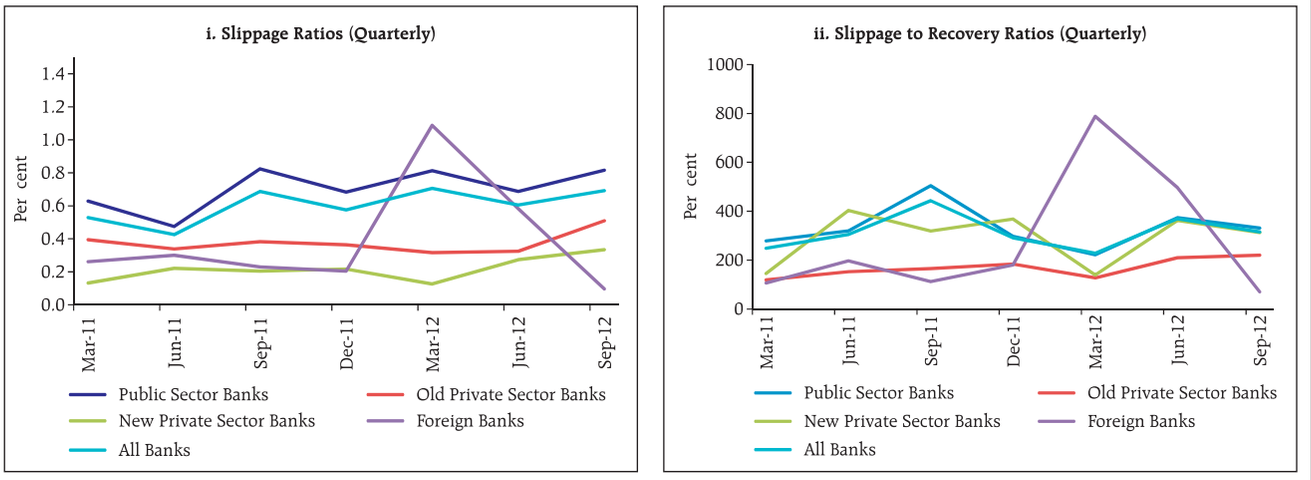
2.34 The concerns on asset quality are also underscored by the increasing trend in the slippage ratio as well as ratio of slippages to actual recoveries (excluding up-gradations). Except for foreign banks, these ratios increased for all bank groups since March 2011. However, slippage to recovery ratio for all the bank groups improved marginally during the quarter ended September 2012 (Chart 2.26 (i) and (ii)). With the growth

Chart 2.25: Growth in Gross NPAs



Source: RBI Supervisory Returns

Chart 2.26: Trends in Slippages



Source: RBI Supervisory Returns

rate in GNPAs continuing to tread well above the credit growth and movements in slippages remaining upward, the profitability of banks may come under pressure in the coming quarters.

Restructuring of advances

2.35 Restructuring of loans (Box 2.1), particularly of big ticket loans under the corporate debt restructuring (CDR) mechanism, has recently come under closer scrutiny due to the steep rise in the number and value of such advances (Chart 2.27 and 2.28).

2.36 Between March 2009 and March 2012, while total gross advances of the banking system grew by less than 20 per cent (compound annual growth rate), the restructured standard advances grew by over 40 per cent. The proportion of restructured standard advances to gross total advances increased from 3.5 per cent in March

Box 2.1: Restructuring of Advances

Restructuring is an accepted practice worldwide through which lenders nurture problematic, but viable borrowal accounts. It is a legitimate strategy adopted by lenders and borrowers especially during times of distress to preserve the economic value of the viable loan accounts. Restructuring has been followed in India for many years and the guidelines in this regard have evolved over a period taking into account international best practices, status of development of financial markets and changing economic conditions. The extant restructuring guidelines cover three broad categories (i) large corporate advances with multiple/consortium banking under Corporate Debt Restructuring (CDR), (ii) SME Debt restructuring mechanism and (iii) Restructuring of other advances. This system has fulfilled its objective to a large extent. These guidelines on restructuring have evolved in the context of international experience.

It is a fact that restructuring of advances across the banking sector has increased during the current financial year as also during the last financial year. This is a matter of concern.

As regards restructuring under CDR mechanism, this has also been in line with increase in non-CDR restructuring. According to data furnished by CDR Cell, there has been a spurt in the number of cases referred to CDR Cell from the year 2011-12 onwards. As against 49 cases involving `226.2 billion referred during 2010-11, 87 cases involving `678.9 billion were referred during 2011-12. During the period April - August of the current year, there are 59 cases involving `306.4 billion being referred to CDR. The reasons for rise in restructuring may be attributed to the effects of global recession coupled with internal factors like domestic slow down, which have played a significant role in the deterioration in asset quality.

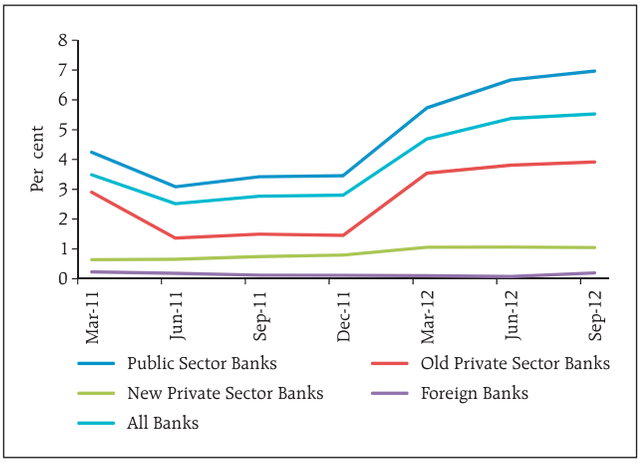
Aggressive lending by banks in the past, banks not exercising oversight on diversification into non-core areas by companies, banks not enforcing discipline on companies regarding unhedged forex exposures and delay in disbursements are areas on which banks ought to exercise much better control. Delay in administrative clearances is an equally important reason for pressure on asset quality which needs correction. The spurt in restructuring of advances is a matter of concern, though it may not have systemic dimension. The Reserve Bank is closely monitoring the position. Some course correction at the level of all stake holders may definitely improve the situation.

With a view to reviewing existing guidelines on restructuring of advances and suggest revisions taking into account the best international practices and accounting standards, the Reserve Bank had constituted a Working Group (WG) under the chairmanship of Shri B. Mahapatra, Executive Director, Reserve Bank of India. The WG has examined the issues and its major recommendations can be summarised as below:

- The regulatory forbearance available on asset classification on restructuring presently needs to be withdrawn after two years.
- During the interregnum, provision on standard restructured accounts which get the asset classification benefit on restructuring be increased from the present 2 per cent to 5 per cent, in a phased manner in case of existing accounts (stock) and immediately in case of newly restructured accounts (flow).
- In view of the importance of infrastructure sector, asset classification benefit on restructuring may however be allowed for a longer period in cases where restructuring is due to change in date of commencement of commercial operation of infrastructure projects.
- A cap of, say 10 per cent, to be prescribed on amount of restructured debt which can be converted into preference/ equity shares.
- RBI may prescribe the broad benchmarks for viability parameters based on those used by CDR Cell; and banks may adopt them with suitable adjustments, if any, for specific sectors.
- Compulsory promoters stake in the restructured accounts to be increased by way of higher sacrifice and personal guarantee.
- Right of recompense may be made mandatory in all cases.
- Disclosure requirements to be made comprehensive but to exclude standard restructured accounts which have shown consistent satisfactory performance.

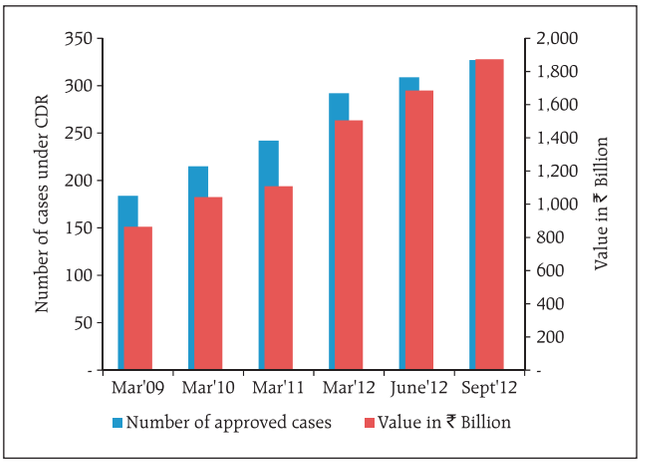
Second Quarter Review of Monetary Policy 2012-13 on October 30, 2012 has announced an increase in the provision for restructured standard accounts from the existing 2.0 per cent to 2.75 per cent in line with a major recommendation of the WG. It has also been announced that draft guidelines on the subject taking into account the recommendations of the WG as also the comments received in this regard will be issued by end-January 2013.

Chart 2.27: Restructured Standard Advances to Gross Total Advances



Source: RBI Supervisory Returns

Chart 2.28: Trend in number and value of cases under CDR

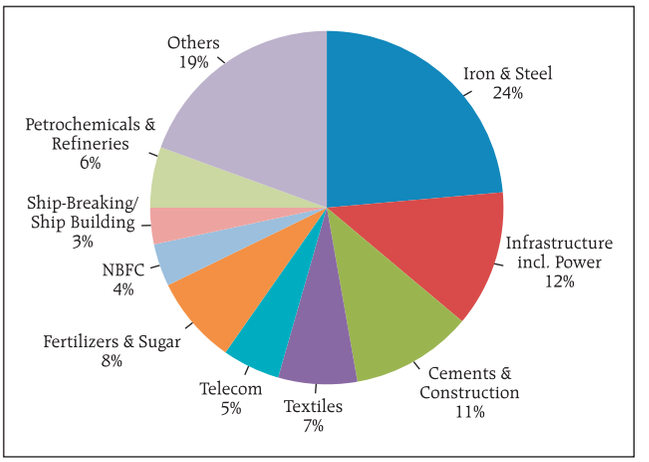


Source: CDR cell

2011 to 4.7 per cent in March 2012. This has further increased to 5.9 per cent as at the end of September 2012.

2.37 Some industrial sectors like iron & steel, infrastructure and textile experienced a much greater degree of restructuring of advances in the recent period (chart 2.29).

Chart 2.29: Industry-wise break-up of value under CDR - June 2012



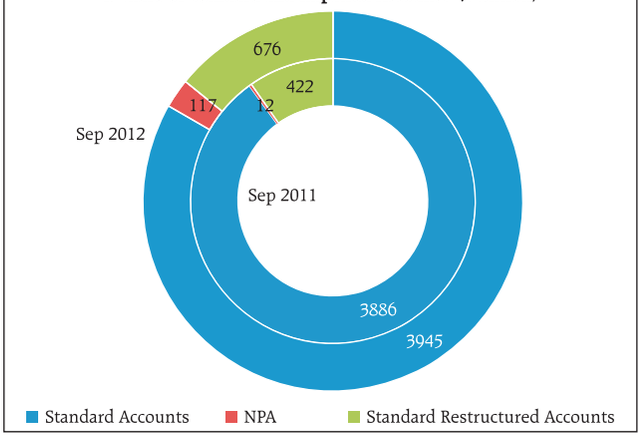
Source: CDR cell

Credit Risk to Power Sector

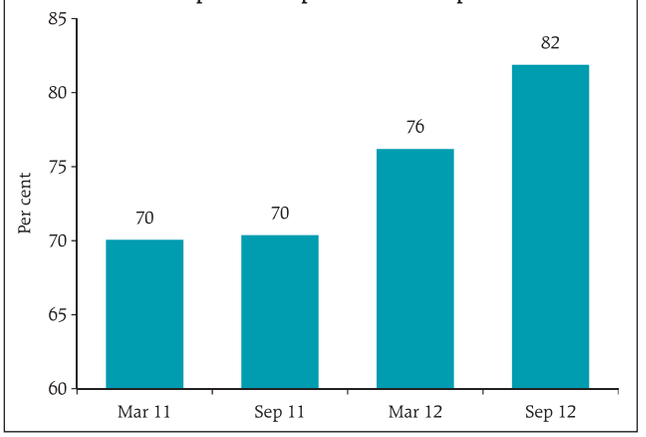
2.38 The risks faced by banks in lending to the power sector were highlighted in the previous FSR. Pressure on asset quality in the power sector has worsened since then. Impairments have risen in the preceding year ending September 2012 (Chart 2.30(i)). Instances of

Chart 2.30: Exposure to Power Sector

i. Share of Standard and Impaired Accounts (₹ Billion)



ii. Proportion of Exposures to Tier I Capital



Source: RBI

restructuring too have registered a steep increase in the recent quarters. The large exposure to this sector remains an area of concern for banks (Charts 2.30(ii)).

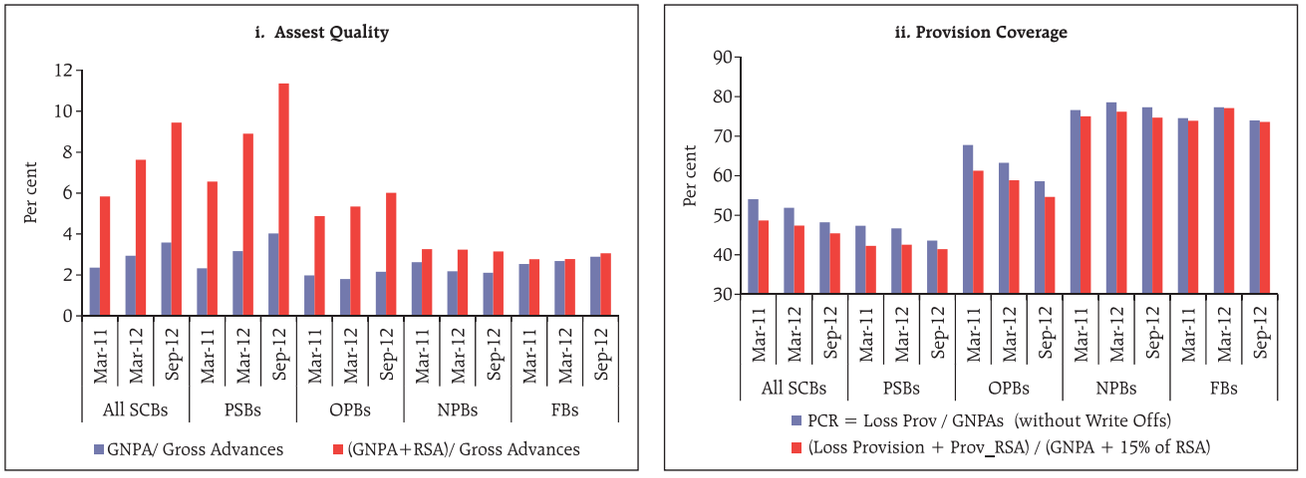
Assessment of Provision Coverage

2.39 An analysis of provision coverage of SCBs was attempted in the context of recent spurt in the NPAs. The impairment levels in Indian banks compare favourably with those of global banks. However, the provision coverage ratio is relatively lower and has also shown a declining trend in recent quarters. In view of this, it may be advisable for banks to increase their provisioning levels (Chart 2.31 and Chart 2.32)

Credit Risk- Stress Testing using Sensitivity Analysis

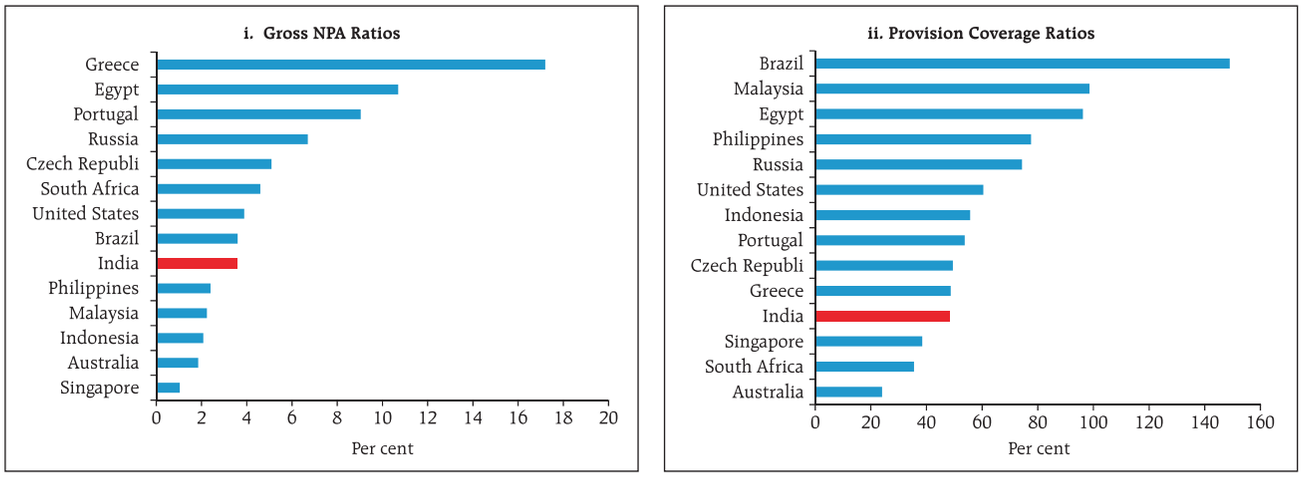
2.40 Sensitivity analysis or single factor stress tests[13] were conducted on the banking system's credit portfolios using different scenarios[14]. The results show that the

Chart 2.31: Asset Quality and Provision Coverage : Impact of Restructuring



Note: RSA : Restructured Standard Advances Stressed Advances = GNPAs + RSA Prov_RSA = Provisioning for RSA
Source: RBI Supervisory Returns

Chart 2.32: Asset Quality and Provision Coverage : Cross Country Comparision



Source: Financial Soundness Indicators (FSI), IMF

[13] Methodologies are given in the Annex.
[14] Enhanced Provision norm- std assets 1%, sub-std assets 30%, doubtful & loss assets 100% assumed.

banking system would be resilient to various stress scenarios (Table 2.4).

Macro Stress Test - Credit Risk

2.41 In order to test the resilience of the Indian banking system against macroeconomic shocks, a series of macro stress tests at system, bank-group and sectoral level were performed using times series econometric tools[15].

2.42 The macro stress tests encompass a series of risk scenarios incorporating a baseline and two adverse macroeconomic scenarios representing medium and severe risk (Table 2.5). The adverse scenarios were derived based on up to 1 standard deviation for medium risk and 1.25 to 2.0 standard deviation for severe risk (10 years historical data).

System Level Credit Risk

2.43 The macro stress test suggests that, if the current adverse macroeconomic condition persists, the system level GNPA ratios could rise from 3.6 per cent as at the end of September 2012 to 4.0 per cent by end March 2013 and 4.4 per cent by end March 2014. The GNPA ratio could go up to 4.8 per cent and 7.6 per cent under the severe risk scenario in the respective periods. Under the severe stress scenario, the system level CRAR of SCBs could decline to 10.9 per cent by March 2014, which is still above the regulatory requirement of 9 per cent (Table 2.6 and Chart 2.33).

Bank Group Level Credit Risk

2.44 Among the four bank-groups, namely, public sector banks (PSB), old private banks (OPB), new private banks(NPB) and foreign banks(FB), PSBs might continue to register highest GNPA ratio. Under baseline scenario, the GNPA ratio of PSBs may rise to 4.3 per cent by March 2013 from 4.0 per cent of September 2012. Whereas, GNPA ratios of OPB, NPB and FB may rise to 2.6 per cent, 2.7 per cent and 3.2 per cent by March 2013 from the

Table 2.4: Stress Tests - Credit Risk: Gross Credit – September 2012

(Per cent)

	System Level		
	CRAR	Core CRAR (Tier I)	NPA Ratio
Baseline:			
All Banks	**13.6**	**10.0**	**3.6**
Select 60 Banks	13.5	9.8	3.6
Stress Scenarios:			
Shock 1	12.0	8.3	5.4
Shock 2	11.2	7.4	7.1
Shock1 : NPAs increase by 50% Shock2 : NPAs increase by 100%			

Source: RBI Supervisory Returns and Staff Calculations.

Table 2.5: Macroeconomic Scenario Assumptions[16]

(Per cent)

FY		Baseline	Medium Stress*	Severe Stress*
2012-13	GDP Growth	5.8	5.2	3.5
	WPI Inflation	7.7	9.5	11.5
	Short-term Interest Rate	8.0	9.1	10.5
	Exports to GDP Ratio	15.7	14.2	12.7
	Gross Fiscal Deficit	5.3	5.8	6.3
2013-14	GDP Growth	6.9	4.7	2.6
	WPI Inflation	6.7	9.4	12.0
	Short-term Interest Rate	7.4	9.3	11.1
	Exports to GDP Ratio	16.0	14.0	12.0
	Gross Fiscal Deficit	4.8	6.2	7.5

Note *: For Financial year 2012-13, the average numbers for the selected macro-variables under medium and severe stress is based on the December 2012 & March 2013 quarters only.

Table 2.6: Projection of System Level GNPA Ratios of SCBs

(Per cent of total advances)

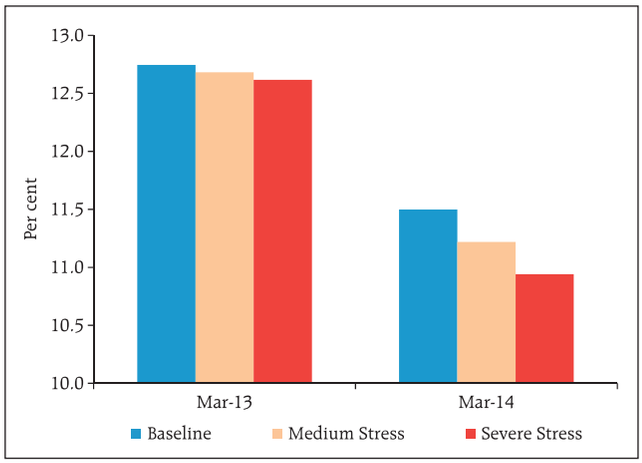
Scenario	Sep-12 (Actual)	Mar-13	Mar-14	Mar-13	Mar-14
		Multivariate Logit Regression		Multivariate Regression	
Baseline	3.6	3.9	4.4	3.8	4.1
Medium Risk		4.0	5.3	3.9	5.1
Severe Risk		4.0	6.4	4.0	6.1
		VAR		Quantile Regression	
Baseline	3.6	3.8	4.4	4.0	4.4
Medium Risk		3.9	6.0	4.4	6.0
Severe Risk		4.0	7.6	4.8	7.6

Note: The GNPAs derived based on VAR and quantile regression, especially for severe shock scenario, are relatively higher. This is because, VAR methodology takes into account feedback impact of credit quality to macro variables and interaction effects leading to higher impact. Whereas, in the case of quantile regression, which deals with the tail risks; the credit quality of the banks, at present, is already under stress and further shocks to macro variables impact the NPA more.

[15] Focus of macro-stress tests is credit risk. This is captured through NPA/slippage ratios. Details are given in the Annex.

[16] These stress scenarios are stringent and conservative assessments under hypothetical-severely adverse economic conditions and should not be interpreted as forecasts or expected outcomes.

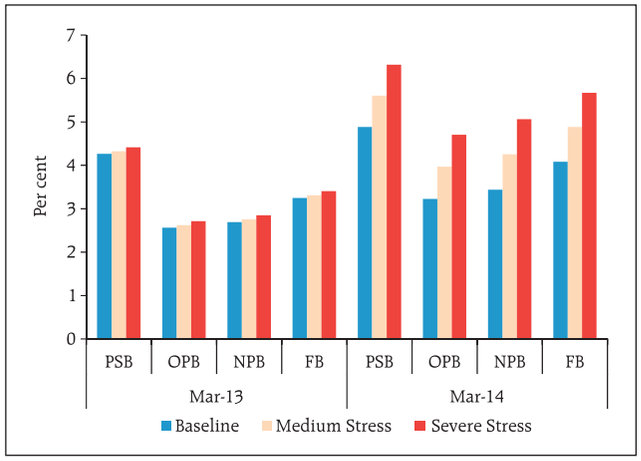
Chart 2.33: Projection of System Level CRAR of SCBs



Note: The CRAR has been derived from the average GNPA of the four models used above.

Source: RBI Supervisory Returns and Staff Calculations

Chart 2.34: Projection of Bank-group wise GNPA ratio (Based on Multivariate Panel Regression)

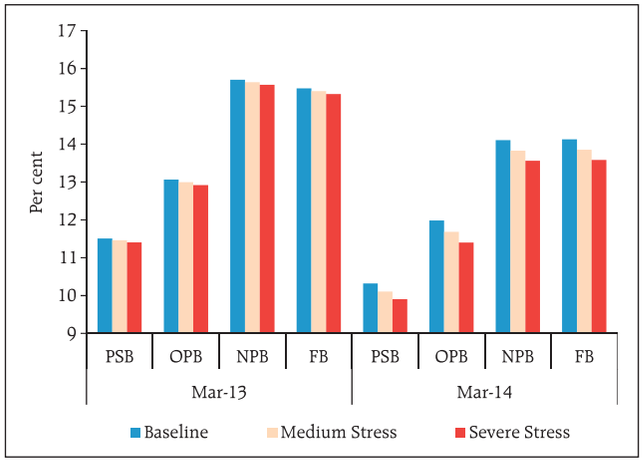


Source: RBI Supervisory Returns and RBI Staff Calculations

2.2 per cent, 2.1 per cent and 2.9 per cent of September 2012, respectively (Chart 2.34).

2.45 Among the bank-groups, PSBs are expected to register lowest CRAR followed by the old private sector banks. Under severe stress scenario, the CRAR of PSBs may decline to 11.4 per cent and 9.9 per cent by March 2013 and March 2014, respectively, which is still above than the regulatory requirement of 9 per cent (Chart 2.35).

Chart 2.35: Projection of Bank-group wise CRAR



Source: RBI Supervisory Returns and Staff Calculations

Sectoral Credit Risk

2.46 Macro stress test of sectoral credit risk revealed that among the selected seven sectors, Agriculture is expected register highest NPA at 5.8 per cent by March 2013, followed by Engineering, Iron & Steel and Construction. However, the adverse macroeconomic shocks seem to have maximum impact on Engineering and Iron & Steel (Table 2.7).

Concentration Risk

2.47 Banks' total credit (funded plus non-funded) exposures (TCE) to individual large borrowers (top 20) shows that the concentration of exposure reduced both in terms of per cent of capital fund as well as gross advances. While the TCE as per cent of capital fund declined from 186.9 per cent at end Mar-10 to 167.4 per cent by end Jun-12, the TCE as percent of gross advances

Table 2.7: Projected Sectoral NPA

(Per cent of total advances)

Sector	Sep-12 (Actual)	Mar-13			Mar-14		
		Baseline	Medium Risk	Severe Risk	Baseline	Medium Risk	Severe Risk
Agriculture	5.2	5.8	5.8	5.9	6.5	6.9	7.3
Construction	3.7	3.5	3.6	3.7	3.3	3.7	4.1
Cement	2.0	2.5	2.6	2.7	3.4	3.9	4.6
Infrastructure	1.5	1.8	1.9	2.0	2.0	2.4	2.9
Iron and Steel	3.9	4.3	4.4	4.7	4.7	5.8	7.0
Engineering	3.5	4.2	4.4	4.7	4.3	5.4	6.6
Automobiles	0.9	1.7	1.7	1.7	1.9	2.3	2.6

Source: RBI Supervisory Returns and RBI Staff Calculations

declined from 32.8 to 27.8 per cent during the same period (Table 2.8).

2.48 Share of banks' funded exposure to their top 20 individual borrowers in banks' total gross advances declined from 22.0 per cent as at end March 2010 to 18.5 per cent by end June 2012, at system level (Chart 2.36). In respect of banks groups, the concentration has been quite high for foreign banks, which may be because of their limited customer/borrower base. Further, the concentration declined in the case of NPBs during the 1st quarter of FY2012-13.

2.49 The stress tests on concentration risk of SCBs show that the impact under various stress scenarios are not significant. The share of top three borrowers to the total credit is about 8.0 per cent (at system level). There is a regulatory cap imposed on banks on their credit exposures to individual and group borrowers. The exposure ceiling limit is 15 percent of capital funds in case of a single borrower and 40 percent of capital funds in the case of a borrower group. The reduction in CRAR under the assumed scenario of default of top three individual borrowers would be 240 basis points and the system should be able to withstand this default. However, at individual level, a few banks with high concentration might be seriously impacted under stressed conditions.

Liquidity Risk

2.50 The liquidity position of banks has improved over the last six months, reflecting the effect of the reduction in the CRR and SLR. The ratio of liquid assets to total assets has increased from 28.9 per cent as at end March 2012 to 30.1 per cent at end September 2012.

2.51 A detailed analysis of the 'quality' of liquidity is captured by the liquidity ratios (Table 2.9). The ratio of volatile liabilities to earning assets, (with both numerator and denominator adjusted for temporary assets) measures the extent to which banks' basic earning assets are funded by less stable sources of funds. This ratio was 40.9 per cent as on September 2010 and has steadily increased to 43.9 percent as at end September 2012, which points towards banks increasingly resorting to short term bulk deposits .

2.52 The ratio of loans including mandatory cash reserves and statutory liquidity investments to total

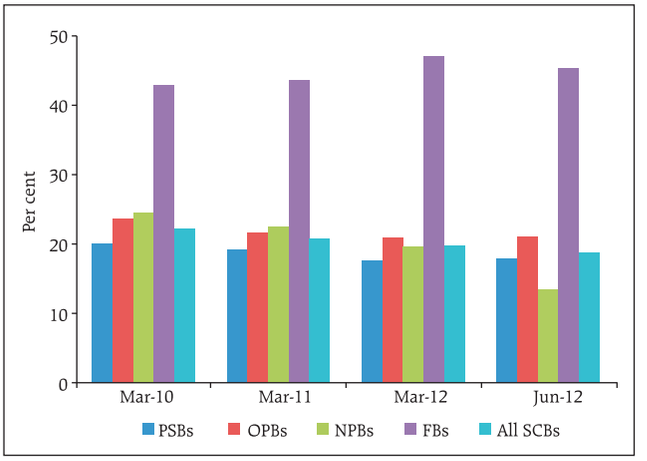
Table 2.8: Banks' Exposure to their Top 20 Individual Borrowers

(Per cent)

Bank Group	Total Credit Exposure (TCE)			
	Mar-10	Mar-11	Mar-12	Jun-12
TCE as % of Capital Fund				
PSBs	201.4	185.4	175.4	178.7
OPBs	191.5	189.8	191.5	194.0
NPBs	149.3	150.0	138.4	110.9
FBs	178.2	179.8	196.7	206.3
All SCBs	**186.9**	**177.3**	**170.4**	**167.4**
TCE as % of Gross Advances				
PSBs	28.7	25.8	24.2	24.6
OPBs	28.4	27.2	25.6	25.8
NPBs	43.6	40.1	36.5	28.5
FBs	70.7	69.4	73.8	74.2
All SCBs	**32.8**	**30.0**	**28.5**	**27.8**

Source: RBI Supervisory Returns

Chart 2.36: Share of Top 20 Individual Borrowers in Total Advances



Source: RBI Supervisory Returns

Table 2.9: Liquidity Ratios

(Per cent)

	Sep-10	Sep-11	Sep-12
(Volatile Liabilities - Temporary Assets) / (Earning Assets - Temporary Assets)	40.9	42.0	43.9
Core Deposits / Total Assets	51.0	49.5	51.2
(Loans + Mandatory CRR + Mandatory SLR + Fixed Assets)/ Total Assets	82.4	59.5	60.6
[Loans + Mandatory CRR + Mandatory SLR + Fixed Assets] / Core Deposits	1.6	1.2	1.2

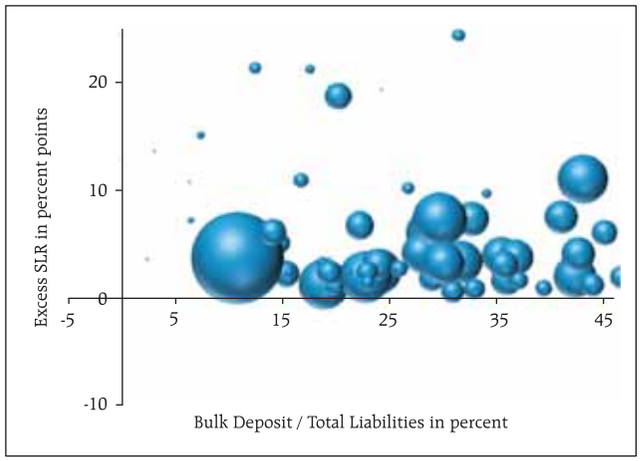
Source: RBI Supervisory Returns

assets has decreased from 82.4 per cent in September 2010 to around 60 percent over the period of last two years, partly reflecting the decrease in statutory reserve ratios over the period of last two years. The decreased ratio although reflecting the slowdown in credit growth also indicates that 'illiquidity' embedded in the balance sheet has come down. The ratio in terms of core deposits has moved from 1.6 in September 2010 to 1.2 as at September 2012 indicating a decrease in purchased liquidity.

Bulk Deposits

2.53 Retail deposits (Current Account, Savings and Term deposits) are inherently more stable as they are diversified and less prone to premature withdrawal. A few public sector banks continued to display a high degree of reliance on 'bulk' deposits (*i.e.* deposits of `10 million and above for the analysis). In some cases the bulk deposits constituted more than 50 per cent of the total liabilities as at end September 2012. Excess SLR securities holdings constitute a bulwark against runs on banks relying on such wholesale sources of funds. Position in respect of bulk deposits and the mitigant in the form of excess SLR holdings is presented in Chart 2.37.

Chart 2.37: Bulk Deposits to Liabilities ratio *vis-a-vis* excess SLR: Size-wise Distribution – September 2012



Note: Size of the bubble corresponds to the amount of liabilities
Source: RBI Supervisory Returns

2.54 According to bank group classification, the proportion of the bulk deposits in total deposits remained high for foreign banks, though there has been slight decline in the last six months. The proportion of the bulk deposits in total deposits has shown signs of stabilising after increasing in last few quarters for the public sector banks. Since term deposits can be withdrawn prematurely[17], such bulk deposits remain prone to withdrawal and/ or non-rollover, posing liquidity risks to the banks relying on such deposits. While a higher proportion of bulk deposits and borrowings in total liabilities of banks make them vulnerable to liquidity shocks, the proportion of their investments in liquid government securities acts as a mitigating factor.

2.55 Deposit growth of banks has been lagging loan growth for several quarters. This exposes the banks to

[17] Premature withdrawal of deposits is permitted by banks in India with some penalty in the form of reduced effective interest rates

Box 2.2: Variable Rate Deposits

RBI allowed commercial banks to fix their own interest rates on domestic term deposits of various maturities with the prior approval of their respective Board of Directors/Asset Liability Management Committee (ALCO), effective October 22, 1997.

The Annual Monetary and Credit Policy for the year 2002-03 had noted the following: "The average cost of deposits for major banks continues to be relatively high. Further, a substantial portion of deposits is in the form of long-term deposits at fixed interest rates. Thus, flexibility available to banks to reduce interest rates in the short-run, without adversely affecting their return on assets, is limited." The Policy document, accordingly, favoured introduction of flexible interest rate deposits with reset at six-monthly intervals where the interest rate could be higher or lower *vis-à-vis* the fixed rate deposit for similar maturity depending on banks' perception regarding inflation and the interest rate outlook over the longer period. Furthermore, banks were also urged to devise schemes for encouraging depositors to convert their existing long-term fixed rate past deposits into variable rate deposits. Commercial banks could consider paying the depositors at the contracted rate for the period of deposit already run and waive the penalty for premature withdrawal if the same deposit is renewed at the variable rate.

Notwithstanding the fact that about 80 per cent of the loans extended by banks are floating rate instruments, only a few banks had introduced floating rate deposit products during the last 10 years.

liquidity stresses as it increases reliance on wholesale sources of funds. In order to boost retail deposits growth, certain product innovations like variable rate deposits could be considered (Box 2.2).

Stress Test - Liquidity Risk

2.56 Liquidity risk analysis has been done using different definitions of liquid assets[18]. The stress scenarios are constructed to test the ability of banks to meet a run on their deposits using only their liquid assets. Under the stress scenarios, there were indications of deterioration in the liquidity position of some banks, though SLR investments helped them to ward off the liquidity pressure (Definition-1; Table 2.10).

2.57 The liquidity stress tests conducted on banks groups reveal that foreign banks have a better liquid asset position to guard against any stress, primarily due to their higher proportion of short term investments / excess SLR and most of their advances portfolio being short-term (less than one year).

Table 2.10: Liquidity Risk: SCBs – September 2012

Liquid Assets Definition		Liquid Assets Ratio (%)				
		Public Sector Banks	Old Private Banks	New Private Banks	Foreign Banks	All SCBs
Definition 1: Baseline		25.7	23.8	21.4	25.9	24.9
Shock 1:	10 per cent total deposit withdrawal 30 days	16.5	14.8	13.5	20.0	16.2
Shock 2:	3 per cent deposit withdrawal each day for 5 days	13.1	11.3	10.5	18.2	13.0
Definition 2: Baseline		5.4	4.2	2.9	11.9	5.4
Shock 1:	10 per cent total deposit withdrawal 30 days	-6.2	-7.2	-6.9	4.8	-5.6
Shock 2:	3 per cent deposit withdrawal each day for 5 days	-10.6	-11.6	-10.5	2.6	-9.6
Definition 1: Cash, Inter-bank-deposits, All-SLR-Investments Definition 2: Cash, Inter-bank-deposits, Excess SLR						

Source: RBI Supervisory Returns and RBI Staff Calculations

Interest Rate Risk

2.58 Investments accounted for 29.8 per cent of assets of the banking system, as at end September 2012. Stress tests carried out to evaluate the valuation impact by marking to market the banking book under different scenarios revealed that the banking system was capable of withstanding such shocks. The maximum impact due

[18] The liquid assets comprise of cash, Inter-bank-deposits and Investments.

to upward movement of yield curve, was on the low maturity buckets on the banking book. Under the scenarios (Shock 1; Table 2.11), the capital position of the banking system is reduced sharply by 320 bps. On the other hand, the impact of direct interest rate risk on the trading book was not high (only about 80 bps). Therefore, overall impact under the assumed scenarios would still be manageable.

Equity Price Risk

2.59 The impact of assumed fall in equity prices by 40 per cent does not impact significantly as the equity market exposure of banks in India is not high. One specific reason is that there are regulatory limits prescribed for the capital market exposure of banks. The system level CRAR falls to 12.9 per cent under stress from the baseline at 13.6 per cent and no bank is severely impacted.

Foreign Exchange Risk

2.60 Banks have direct exposure that is visible in balance sheet items like foreign exchange liabilities and commitments provided to overseas branches. While the Indian banking system's liabilities to overseas entities has grown over the last several years, it has dwindled as a proportion of total liabilities (Chart 2.38). Likewise, their foreign claims (assets abroad on an ultimate risk basis) too have grown strongly but have remained largely unchanged as a proportion of total assets (Chart 2.39). This suggests low direct exposures to exchange rate risks (indirect foreign exchange risk, through unhedged corporate exposure is discussed in para 1.23 of Chapter I).

2.61 The relatively more flexible 'internal models' approach under Basel-II allows each bank to measure its exposure after incorporating the relationships among its various trading and non-trading operations (model risk is discussed in para 3.9 of Chapter III). However, the use of 'internal models' approach for analysis of the foreign exchange risk across various banks is constrained, due to the differences in the business models of banks and other related factors.

2.62 The foreign exchange risk under various scenarios (where INR appreciation of 10 and 20 per cent and depreciation of 10 and 20 per cent are assumed), do not show much impact on the commercial banks mainly

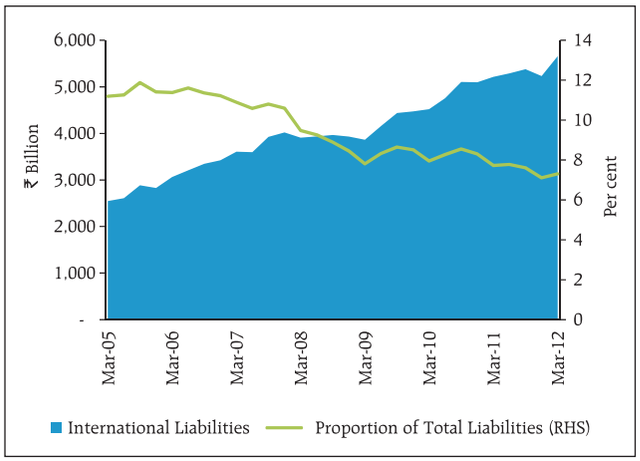
Table 2.11: Interest Rate Risk – Trading and Banking Books September 2012

(Per cent)

	CRAR (system level)		Core CRAR (system level)	
Baseline:				
All Banks	**13.6**		**10.0**	
Select 60 Banks	13.5		9.8	
Stress Scenarios - Interest Rate Risk : Valuation Impact (Modified Duration Analysis)				
	Banking Book	**Trading Book**	**Banking Book**	**Trading Book**
Shock 1	10.3	12.7	6.7	9.1
Shock 2	11.6	13.1	8.0	9.4
Shock 1 - Parallel upward shift of the INR yield curve by 250 bps Shock 2 - Inversion of the INR yield curve 250 to -100 linearly				

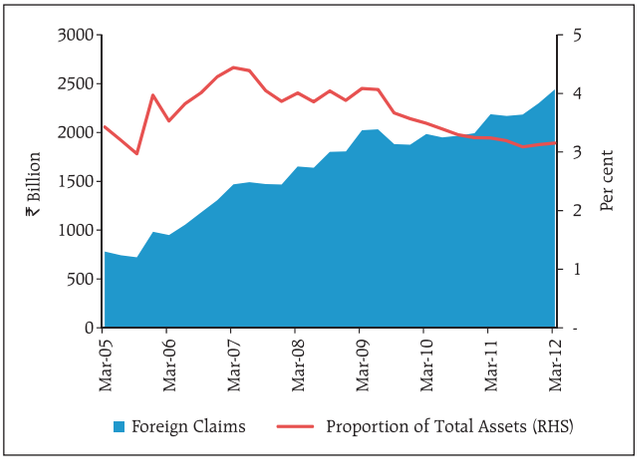
Source: RBI Supervisory Returns and RBI Staff Calculations

Chart 2.38: International Liabilities of Indian Banks



Source: RBI Supervisory Returns and BIS' International Banking Statistics

Chart 2.39: Foreign Claims of Indian Banks



Source: RBI Supervisory Returns and BIS' International Banking Statistics

because of low net open currency positions of individual banks. The reduction in CRAR is only 20 basis points under the assumed scenarios.

Derivatives Portfolio of Banks

2.63 Derivatives could engender systemic risk on account of the size of the over-the-counter (OTC) segment of the derivatives market and the high concentration of financial obligations, with a relatively small number of banks serving as counterparties to a large number of OTC derivative transactions.

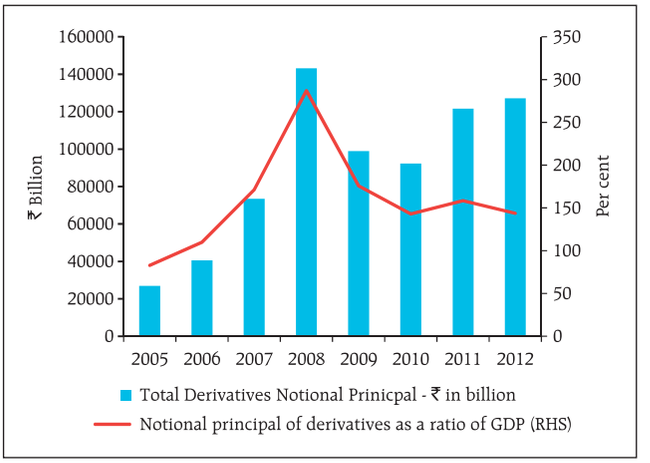
2.64 The derivatives market in India grew sharply in the years leading up to the global financial crisis. Though the portfolio size has shrunk since 2008, it still remains large with the notional outstanding principal of the derivatives portfolio of banks constituting over 1500 per cent of banks' capital funds and over 160 per cent of its total assets as on March 31, 2012 (Chart 2.40 and Table 2.12). A significant degree of concentration exists in the Indian derivative markets with foreign banks as a group constituting 70 per cent of the outstanding notional principal in the derivatives market, disproportionate to their share in balance sheet assets of the banking system at 7 per cent. Further, the share of the top five banks in notional principal outstanding constituted 43 per cent of the outstanding notional of the derivatives portfolio of all scheduled commercial banks as on March 31, 2012.

2.65 The bulk of outstanding derivative transactions are interbank transactions – for the 26 banks with the largest derivatives exposures, the interbank segment of the derivatives market constituted, on an average, 76 per cent of the total outstanding derivatives as at September 2012 (Chart 2.41). This accentuates the inter-connectedness between banks and increases the risk of contagion arising from the failure of any bank. Contagion analysis shows that in case of the top six banks in terms of derivatives exposure, the loss from failure of any one bank increases significantly when non fund based exposures are considered along with fund based exposures (Chart 2.42).

Credit risk emanating from derivative receivables

2.66 The net mark to market (MTM) value of the derivatives portfolio for the banks in the sample varied across the two segments – with most banks registering

Chart 2.40: Notional Principal Outstanding in Derivatives Market



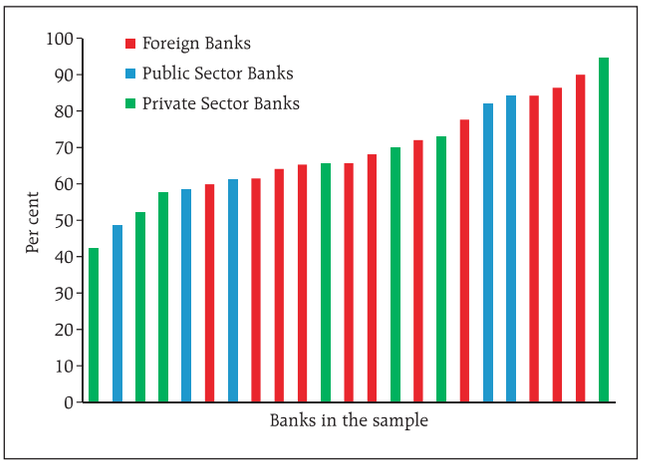
Source: RBI Supervisory Returns

Table 2.12: Relative Size of the Derivatives Market in India – March 2012

` billion	All Banks	Top 5 banks*	Top 10 banks*
Derivatives Notional Principal	127000	55000	87000
Total Assets	78000	7000	12000
Capital Funds	8000	1000	2000
Notional Principal as % of Assets	162.8	785.7	725.0
Notional Principal as % of Capital	1587.5	5500.0	4350.0

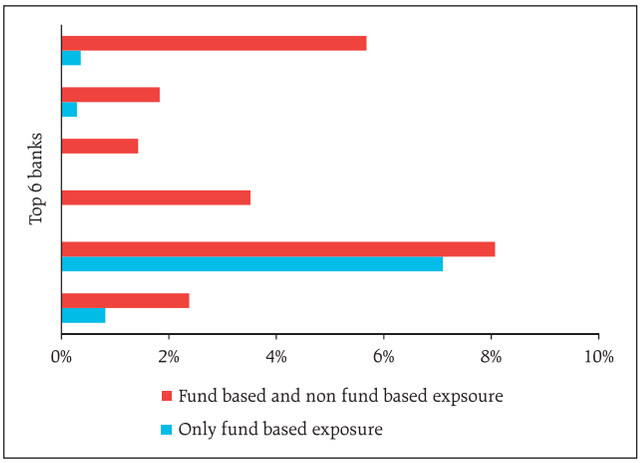
Note : i. *Top banks as per derivatives notional principal
ii. Amount rounded off to nearest `1000 billion
Source : RBI Supervisory Returns

Chart 2.41: Share of Interbank Segment in Total Derivatives Transactions – September 2012



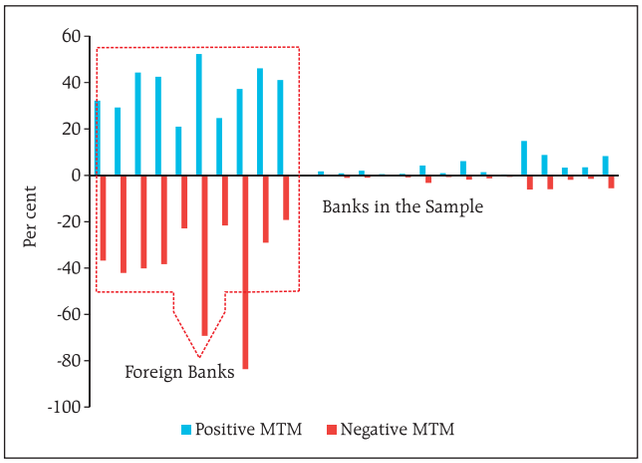
Source: Data collected from sample set of banks and RBI Staff Calculations

Chart 2.42: Contagion Loss as a percentage of Capital Funds[19] – September 2012



Source: RBI Staff Calculations

Chart 2.43: MTM in Customer Segment as ratio of Capital Funds September 2012



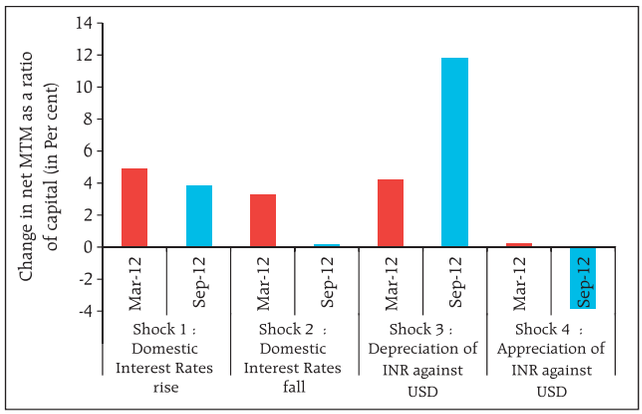
Source: Data collected from sample set of banks and RBI Staff Calculations

negative net MTM in case of the interbank segment and positive net MTM in case of the customer segment. The receivables from the customer segment constituted 26 per cent of the total receivables of banks. The gross receivables from customers were relatively small *vis-à-vis* the capital funds in case of public and private sector banks, while they were significantly higher in foreign banks. The credit risk emanating from these positions will need to be carefully monitored (Chart 2.43).

Sensitivity of the derivatives portfolio to market risks

2.67 A series of stress tests was carried out on the derivatives portfolio as on September 30, 2012 by a sample of 26 banks based on a common set of four interest rate and exchange rate sensitivity shocks[20]. The sample of banks and shocks were the same as used for the analysis presented in the June 2012 issue of the FSR. The results of the stress testing indicate that the sensitivity of the derivatives portfolio to market movements has increased in the period since the publication of the previous FSR, as the average change in net MTM as a ratio of capital based on a worst case analysis across the four shocks (the maximum impact across the set of four shocks) has increased from 2 per cent as at March 2012 to 10 per cent as at September 2012. The impact of individual shocks, however, displays mixed trends (Chart 2.44).

Chart 2.44: Impact of Application of Shocks as on March 31, 2012 and September 30, 2012



Note: Impact is measured in terms of change in net MTM post application of each shock as a ratio of capital funds of the bank. Where the net positive MTM of the bank increases after application of the shock, the impact of the shock is more severe in September 2012 if the increase in September 2012 is lower as compared to the increase in March 2012.

Source: Data collected from sample set of banks and RBI Staff Calculations

[19] Contagion loss refers to the loss caused to the banking system due to the failure of a trigger bank (one bank at a time). For more details refer to the analysis of contagion in the network of the banking system (para 2.11).

[20] For details on shocks, refer to the Annex

2.68 The average impact of the application of shocks stood at about 10 per cent of capital funds. However, there were some outlier banks where the impact was significantly higher (Chart 2.45).

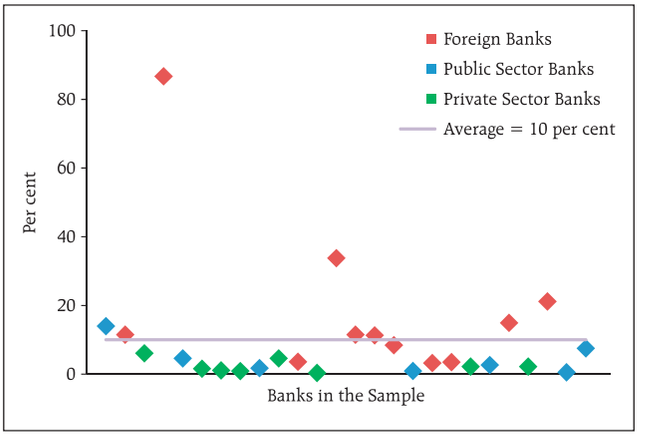
Profitability

2.69 An analysis of main components of income shows that the growth in interest income as well as interest expense has declined during the half year ended September 12, but the decline was comparatively sharper in case of interest expense. This, apart from other factors, has contributed to growth in earnings before provisions and taxes (EBPT). The profit after tax has also grown at a rate of 36.8 per cent, reaching close to the growth rate of 37.4 per cent observed in September 2007 (Chart 2.46).

2.70 The profitability during the current half year has been supported by a faster growth in other items of income like miscellaneous income, profit from trading and forex during the first half year (Chart 2.47). The commission income from selling insurance and mutual fund products by banks has also increased in recent period.

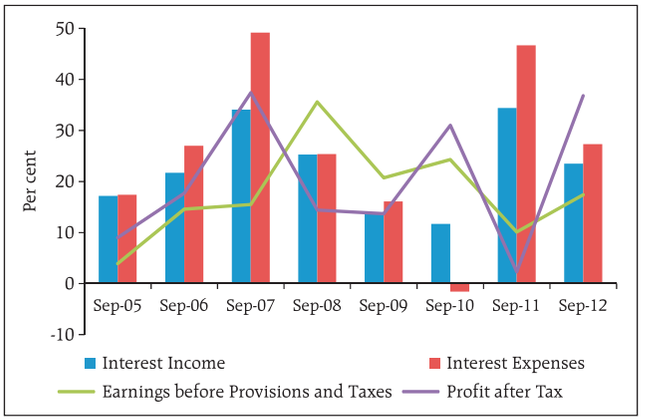
2.71 The provision cover of many large banks, mainly the public sector banks, has steadily declined during last few quarters (Chart 2.48). The fall in provision coverage ratio (without write-offs), apart from other factors has perhaps helped banks in reporting an improved profit performance over the last two quarters, even as NPAs

Chart 2.45: Change in Net MTM as ratio of Capital Funds of Banks September 2012



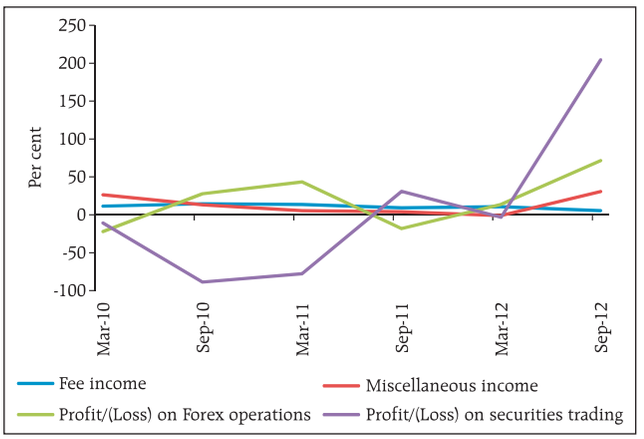
Note: Based on Worst Case Analysis (the maximum impact on the net MTM positions amongst the four sensitivity stress tests).
Source: Data collected from sample set of banks and RBI Staff Calculations

Chart 2.46: Growth rate in EBPT, PAT, Interest Income and Interest Expenses



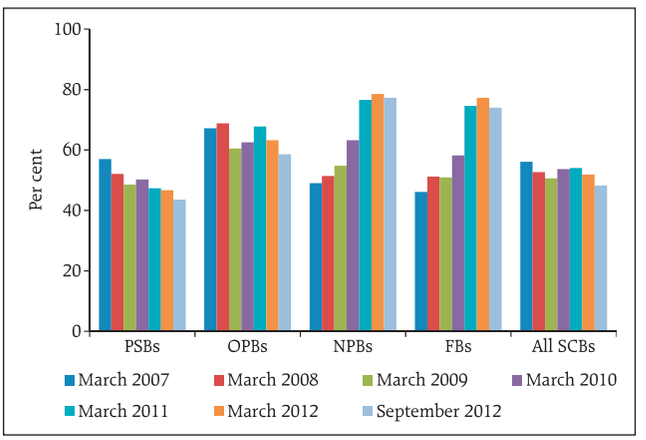
Source: Supervisory Returns

Chart 2.47: Growth rate (Y-o-Y) in some select items of incomes - All SCBs



Source: Supervisory Returns

Chart 2.48: Provisioning Coverage Ratio – SCBs



Source: Supervisory Returns

have increased during the period. This effect is more marked in the cases of public sector banks, as they have experienced the fastest growth in NPAs and restructured assets.

2.72 The net interest margin (NIM) at the system level has remained stable at about 3.0 per cent but declined slightly for a few large public sector banks. Going ahead, the NIM of the banks may remain under pressure as the benefit of a possible decline in cost of funds is likely to be offset by declining asset yields.

Regional Rural Banks

2.73 An analysis of financial soundness indicators and balance sheet components of Regional Rural Banks (RRBs) reveals that the financial performance of RRBs bas been improving (Table 2.13). Fewer banks made losses during 2011-12 compared to 2010-11(3 as opposed to 7 earlier) and the loss amount too has shrunk from `710 million to `280 million. While there has been 17.7 per cent growth in advances, deposits have grown to the extent of 12.1 per cent on a y-o-y basis. As on date, 19 RRBs in 6 states have been amalgamated across 12 sponsor banks. 71 RRBs are now in existence against 82 RRB prior to amalgamation.

Table 2.13: Performance Parameters of RRBs

(` Million)

S. N.	Parameters	2010-11	2011-12	% Growth
1	Owned Fund	13,8390	16,4620	18.95
2	Deposit	1,66,2320	1863360	12.09
3	Gross Loan (O/s)	98,9170	1163850	17.66
4	CD Ratio	59.51	62.46	4.96
5	Accumulated Losses	1,5320	13320	-13.05
6	Net Profit	1,7860	18860	5.59
7	Loss (No. of RRBs)	710 (7)	280 (3)	-60.56
8	Gross NPA %	3.75	5.03	34.13
9	Net NPA %	2.05	2.98	45.36
10	Branch Productivity	165.7	179.0	8.02
11	Staff Productivity	37.8	40.7	7.67

Source: NABARD

Urban Co-operative Banks

2.74 There were 51 Scheduled UCBs (SUCBs) as on September 30, 2012. An analysis of all SUCBs revealed that overall CRAR declined from 12.8 per cent as on March 31, 2012 to 12.6 per cent as on June 30, 2012 and thereafter increased marginally to 12.7 per cent as on September 30, 2012. GNPA ratio increased from 4.6 per cent as on March 31, 2012 to 5.9 per cent as on June 30, 2012 and increased further to 6.1 per cent as on September 30, 2012. Annualised RoA improved from 0.9 per cent as on March 31, 2012 to 1.3 per cent as on June 30, 2012 and thereafter declined to 1.1 per cent as on September 30, 2012. Liquidity Ratio based on stock approach for the SUCBs which was 34.0 per cent as on March 31, 2012 as well as June 30, 2012 improved marginally to 34.1 per cent as on September 30, 2012. Provision Coverage Ratio of SUCBs declined from 76.2 per cent as on March 31, 2012 to 66.0 per cent as on June 30, 2012 and thereafter improved to 66.2 per cent as on September 30, 2012 (Table 2.14).

Table 2.14: Select Financial Soundness Indicators of SUCBs

(Per cent)

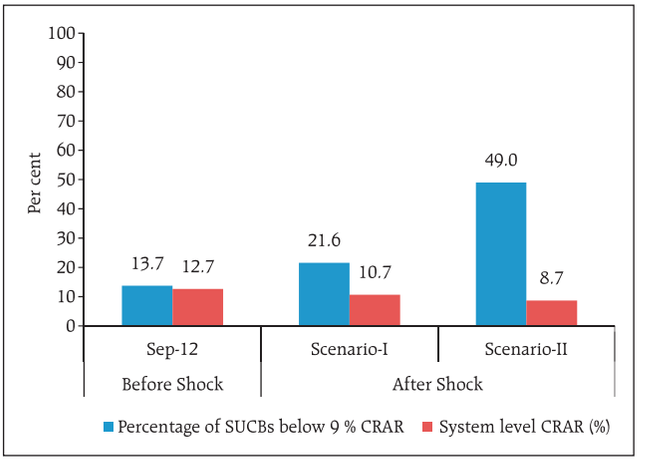
Financial Soundness Indicators	March 2012	June 2012	September 2012
1. CRAR	12.8	12.6	12.7
2. Gross NPAs to Gross Advances	4.6	5.9	6.1
3. Return on Assets (annualised)	0.9	1.3	1.1
4. Liquidity Ratio	34.0	34.0	34.1
5. Provision Coverage Ratio	76.2	66.0	66.2

Note: 1. Data exclude MMCB;
2. Data are provisional and based on OSS Returns;
3. Liquidity Ratio = 100 * (Cash + due from banks + SLR investment) / Total Assets;
4. PCR is compiled as "NPA provisions held as per cent of Gross NPAs".

Stress Test - SUCBs - Credit Risk

2.75 Stress tests on credit risk were carried out for SUCBs using the data based on Off-Site Surveillance (OSS) returns as on September 30, 2012. The impact of credit risk shocks on the CRAR of SUCBs was assessed under two different scenarios assuming an increase in the GNPA by 50 per cent and 100 per cent respectively. The results show that SUCBs could withstand shocks assumed under the first scenario easily, though they would come under some stress under the second scenario (Chart 2.49).

Chart 2.49: Impact of NPA Shocks on Capital Position: SUCBs September 2012

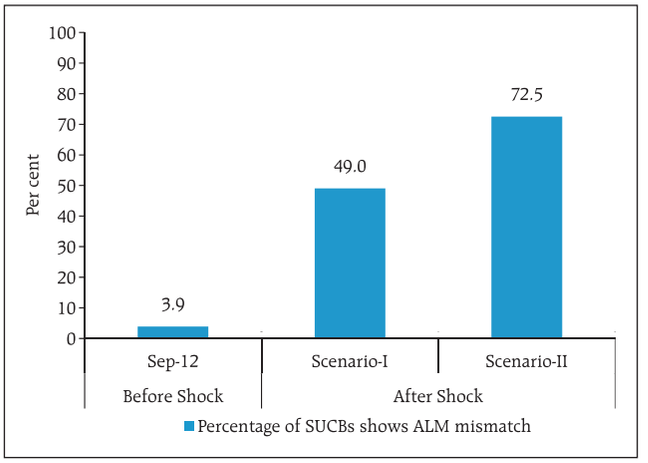


Source: RBI Supervisory Returns and Staff Calculations

Stress Tests – SUCBs - Liquidity Risk

2.76 Stress tests on liquidity risk were carried out under two different scenarios assuming an increase in cash outflows in the 1 to 28 days time bucket by 50 per cent and 100 per cent respectively. It was assumed that there was no change in cash inflows under both the scenarios. The banks would be considered to be impacted as a result of the stress if the mismatch or negative gap (*i.e.* the cash inflow less cash outflow) in the 1 to 28 days time bucket exceeds 20 per cent of outflows. The stress test results indicate that the SUCBs would be significantly impacted even under the less severe stress scenario (Chart 2.50).

Chart 2.50: Liquidity Risk: ALM Mismatch - SUCBs – September 2012



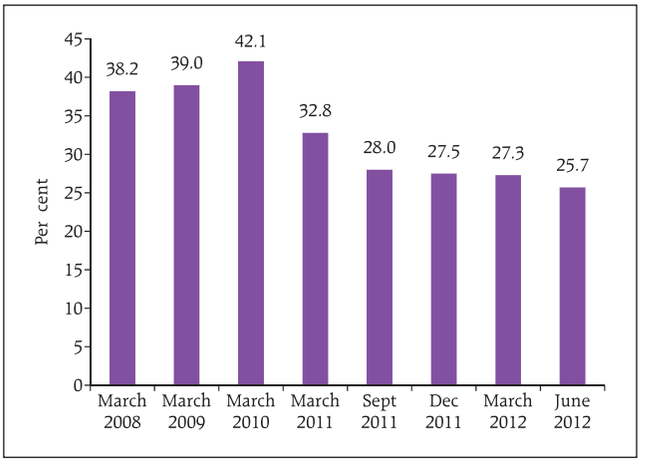
Source: RBI Supervisory Returns and Staff Calculations.

Non-Banking Financial Companies (NBFCs)

2.77 In India, this sector has been in the regulated space and its growth and development has been under the oversight of the Reserve Bank. Among NBFCs, the highest monitoring attention is accorded to firms identified as systemically important, specifically, the Non-Bank Financial Companies - Non-Deposit Taking – Systemically Important (NBFC-ND-SI). The CRAR norms were extended to NBFCs-ND-SIs and they are required to maintain a minimum capital, consisting of Tier-I and Tier- II capital, of not less than 15 per cent of their aggregate risk-weighted assets.

2.78 The aggregate CRAR of the ND-SI sector stood at 25.7 per cent for the quarter ended June 2012 (Chart 2.51). While it is high, the ratio has been deteriorating in the last few quarters. The gross NPA ratio[21] of the NBFC

Chart 2.51: Trends in Capital to Risk Weighted Assets Ratio



Source: RBI Supervisory Returns.

[21] The NBFC Sector follows the 180 day norm for recognition of NPAs as opposed to the 90-day norm in case of commercial banks.

sector has remained stable around 2.0 per cent for the past many quarters (Chart 2.52).

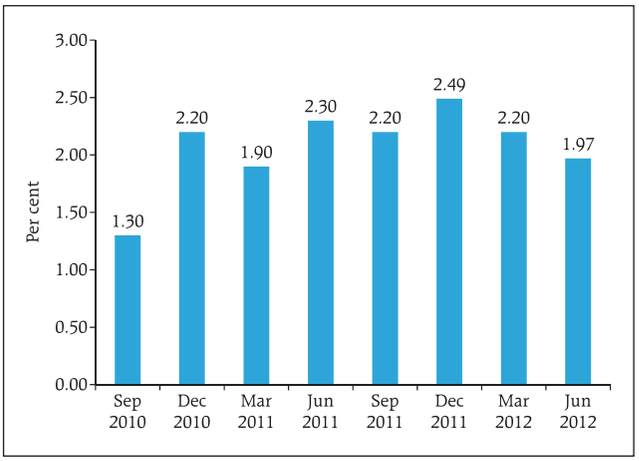
Profitability Ratios

2.79 The return on assets (net profit as a percentage of total assets) of the NBFCs-ND-SI sector stood at 2.1 per cent for the quarter ended June 2012 as compared with 2.5 per cent for the same quarter in the previous year (Chart 2.53).

Sources & Uses of Funds of NBFC Sector

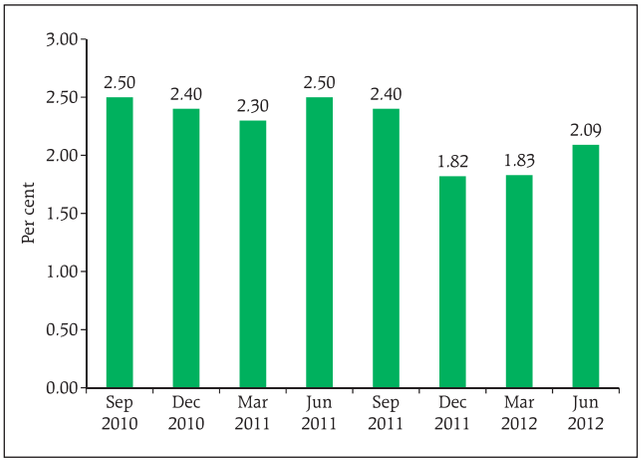
2.80 NBFCs (ND-SI) collect funds from a wide range of sources including debentures, borrowings from banks, financial institutions, commercial paper, inter-corporate borrowings etc (Chart 2.54). Owned fund is another prospective source of finance for NBFCs (ND-SI) and is accounted for 26 per cent of total liabilities. Of these sources of funds, accessing funds through debentures constitute a major portion of total funds followed by borrowings from banks. On the assets side, loans & advances is the major use of funds and is accounted for 72 per cent of total uses of funds.

Chart 2.52: Trends in Gross NPA Ratio



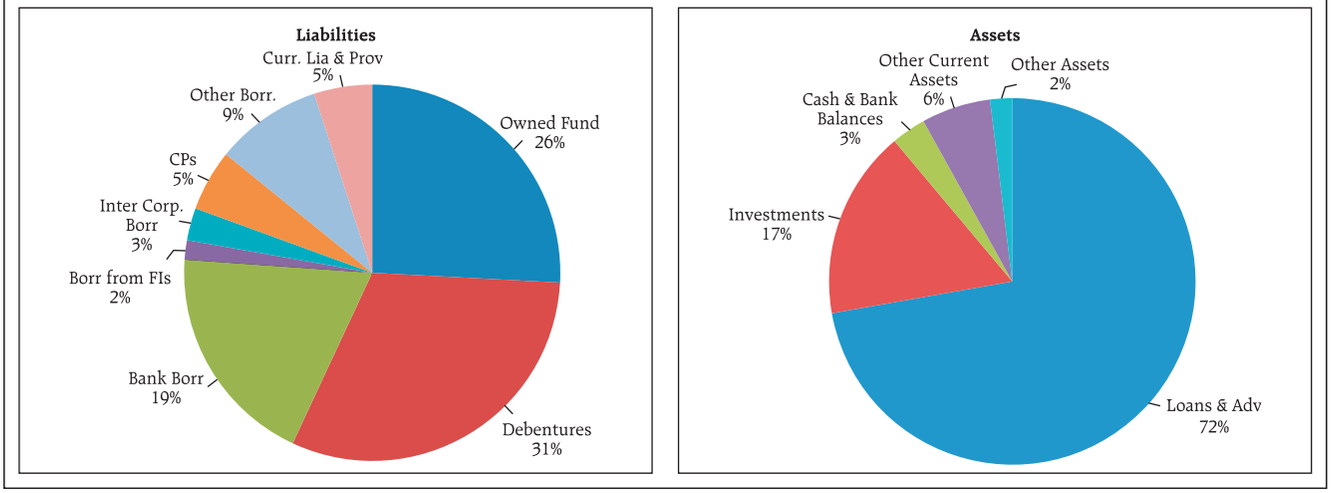
Source: RBI Supervisory Returns

Chart 2.53: Trends in Return on Assets



Source: RBI Supervisory Returns

Chart 2.54: Sources and Uses of Funds – As on June 30, 2012



Source: RBI Supervisory Returns

2.81 Advances of NBFCs to real estate sector on an average accounted for 4.5 per cent of total advances of the ND-SI sector (Chart 2.55).

2.82 Capital market exposure(CME) includes (i) investments in listed instruments and (ii) advances to capital market related activities. CME of the NBFC sector on an average accounted for 9.0 per cent of total assets of the ND-SI sector, while CME to owned funds of the sector accounted for 34.5 per cent (Chart 2.56).

Infrastructure Finance Companies (IFCs)

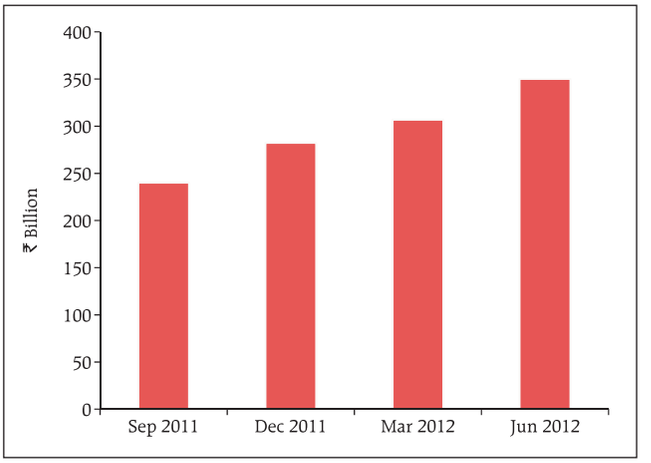
2.83 Aggregate balance sheet size of the eight IFCs increased by 27.5 per cent during 2011-12 on top of 25.3 per cent growth witnessed in the previous year. Debentures of these companies increased more than 2.5 times during the period of three years *i.e.* from March 2010 to March 2012 (Chart 2.57). This may be largely due to raising of huge funds through non-convertible debentures. Bank borrowings of IFCs increased marginally by 0.7 per cent in 2011-12 as against 14.3 per cent growth witnessed in the previous year.

2.84 Leverage ratio of the IFCs hovered between 5.1 and 5.7 during the period under review. The share of bank borrowings in total liabilities decreased from 17.5 per cent as on March 31, 2010 to 12.5 per cent as on March 31, 2012, while the share of debentures increased from 34.5 per cent to 56.9 per cent during the same period. Return on assets of the IFCs, witnessed decelerating trend, it declined from 2.5 per cent as on March 2010 to 2.1 per cent as on March 2012. In tandem with RoA, return on equity also decelerated (declined from 15.1 per cent to 14 per cent) during the period under review.

Stress testing the NBFC sector (NBFC-D and ND-SI)

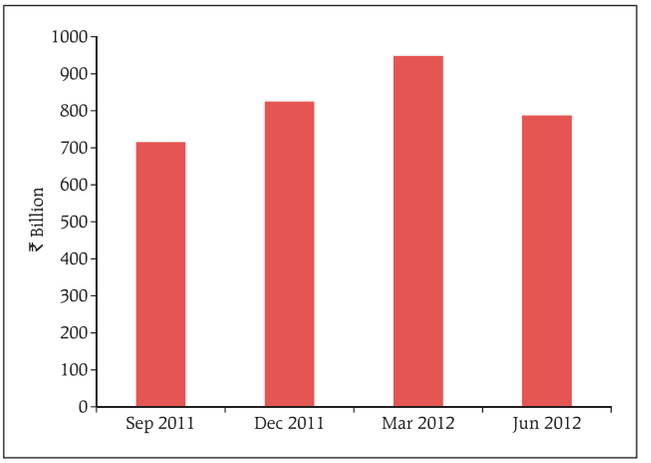
2.85 A stress test on credit risk for NBFC sector (includes both deposit taking and ND-SI) for the period ended June 2012 was carried out under two scenarios (i) where gross NPA increased two times and (ii) gross NPA increased 5 times from the current level. It was observed that in the first scenario, CRAR dropped by 0.7 percentage points from 26 per cent to 25.3 per cent while in the second scenario CRAR dropped by 2.5 percentage points (CRAR dropped from 26 per cent to 23.5 per cent). It may be concluded that even though there was shortfall in provisioning under both the scenarios, the impact on

Chart 2.55: Trends in Advances to Real Estate Sector



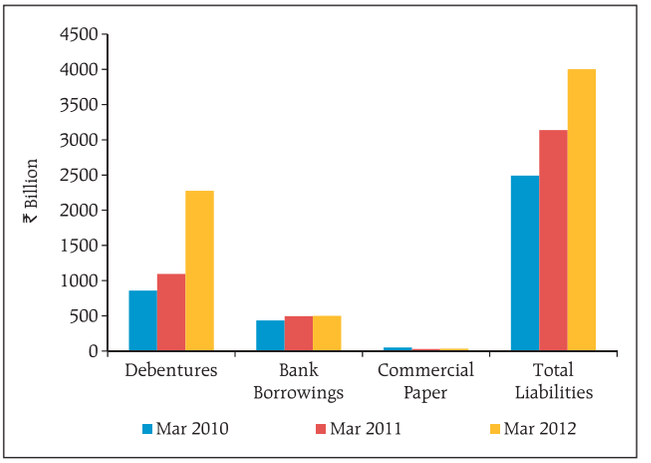
Source: RBI Supervisory Returns

Chart 2.56: Trends in Exposure to Capital Market



Source: RBI Supervisory Returns

Chart 2.57: Trends in Select Sources of Funds - IFCs



Source: RBI Supervisory Returns.

CRAR was negligible as the sector had a higher level of CRAR at 26 per cent as against the bench mark CRAR of 15 per cent.

Stress Testing Major Individual NBFCs

2.86 A stress test on credit risk for major individual NBFCs for the period ended June 2012 was also carried out under two scenarios (i) where gross NPA increased two times and (ii) gross NPA increased 5 times from the current level. Under first scenario, it was observed that 4.9 per cent companies would have CRAR less than regulatory CRAR of 15 per cent while in second scenario, CRAR of 9.5 per cent companies was found to be less than regulatory CRAR of 15 per cent.

Pension System in India[22]

2.87 During financial crises a steep fall in asset prices trigger redemption pressure which is a potential destabiliser for the fund management industry. In such stressed scenario, only long-term funds such as, pension funds can be a source of financial stability providing buying support. The larger the pension funds' investible resources, the stronger will be the stabilising force. In India, a continued reliance on unsustainable pay-as-you-go pension schemes in the government has the potential for an adverse impact on financial stability by raising fiscal deficit. In the case of civil servants, a transition from the pay-as-you-go Defined Benefit to a fully funded Defined Contribution pension system has already been made for the centre and for a large majority of the states. However there exist a large number of Defined Benefit schemes for the unorganised sector both at the level of the centre and the states. These schemes which mainly target either the people Below Poverty Line (BPL) or occupational groups vary in terms of the benefit structures, administrative mechanisms and coverage. Often the scheme is announced without any actuarial estimation of the future liability or the funding requirement. However, unless a fiscally sustainable mechanism for delivering this goal is designed risks would be either an inadequate coverage or a poor benefit structure.

2.88 Infrastructure financing gap act as a drag on economic growth. Pension funds being long-term funds can be used to finance infrastructure projects. The working sub-group on infrastructure, Planning Commission has estimated available resources to the tune of `1507 billion to come from insurance/pension fund. It has also recommended the necessity of regulatory reforms for insurance/pension funds to mobilise savings through these channels into infrastructure.

[22] **Source:** Pensions Funds Regulatory and Development Authority (PFRDA)

Chapter III

Financial Sector Regulation and Infrastructure

The global regulatory reforms agenda has largely crystallised. The focus is now on timely implementation. As a number of economies have announced their regulatory standards, concerns have emerged on the consistency of regulatory changes across jurisdictions. For emerging and developing economies (EDEs), there could potentially be negative consequences of the reform measures, especially from the extraterritorial nature of some reforms. Indian banks will face challenges as they migrate to Basel III given the declining asset quality and regulatory changes necessitating additional provisioning. Risks from the increased use of models, as banks migrate to advanced approaches under Basel II, will need to be managed.

The identification metrics for Financial Conglomerates (FCs) will need to be fine tuned to take into account the work being done internationally for the identification of domestic systemically important banks (D-SIBs) and systemically important insurance companies and non-banking financial entities. The non-banking financial segment in the country is small relative to peer nations, but is growing at a faster pace. Gaps in the regulatory coverage of the non-banking financial sector will need to be progressively addressed.

Significant progress is being made in the implementation of OTC derivative reforms in the country. Mandating or incentivising migration to guaranteed clearing will need that certain legal/ regulatory issues related to bilateral netting, exposure norms, etc. are addressed. Initiatives are being taken to address issues such as low coverage levels and delayed payments to depositors by the Deposit Insurance and Credit Guarantee Corporation (DICGC).

Financial inclusion and literacy are tools to ensure growth with equity. Financially aware citizens make choices that strengthen financial system through greater use of financial products. This chapter also covers the efforts towards financial inclusion and literacy that the government and regulators have undertaken in the interest of financial stability. The aim of such efforts is to provide easy access to financial products and ensure that savings remain within the formal financial sector for productive deployment.

Regulatory Infrastructure

Implementation of Global Regulatory Reforms

3.1 In the wake of the financial crisis, an ambitious global reforms agenda focusing on major risks to the stability of the financial system was launched. The reform initiatives announced include the Basel capital and liquidity framework, policy measures for global systemically important financial institutions (G-SIFIs), over-the-counter (OTC) derivatives market reforms and strengthening the regulation and monitoring of the shadow banking system. The focus has now progressed from policy formulation to effective and timely implementation.

3.2 A progress report[1] on the implementation of the Basel Committee recommendations observed that several member countries have missed the globally-agreed implementation dates for Basel II and 2.5. In case of Basel III, ten countries have published the final domestic guidelines. The Basel Committee is, however, hopeful that the remaining jurisdictions will finalise their domestic regulations during the year 2013. Implementation delays have also been observed in case of several other reform measures, *e.g.* implementing an effective resolution regime for G-SIFIs, convergence of accounting standards, reducing reliance on credit rating agencies and achieving the full implementation of the agreed reforms in the OTC

[1] http://www.bis.org/press/p121029.htm

derivatives market. At the implementation stage, some jurisdictions are finding it necessary to modify some of the regulatory prescriptions to ensure that transitions are non disruptive.

3.3 Consistency in the implementation of reforms has emerged as a key concern as several jurisdictions have come out with their own regulatory standards. A Basel Committee review of the implementation of domestic Basel III guidelines, for example, found inconsistencies in risk measurement approaches in some jurisdictions. Such differences could potentially lead to migration of financial sector activities to less regulated jurisdictions and/or to the shadow banking sector with stability implications for the global financial system. It is important to ensure that there is no disharmony between the regulations in different jurisdictions so as to avoid confusion and regulatory arbitrage, which would ultimately erode the credibility of the reforms process.

Side-effects of Regulatory Reforms

3.4 Concerns have emerged about the unintended side effects of regulatory reforms. These might be significant in case of EDEs. It is important to ensure that financial intermediaries in EDEs are not placed at a relative disadvantage as the opportunities, risks and challenges they face are different. Also, EDEs may be adversely impacted if demanding regulatory standards lead to deleveraging by global financial institutions in these economies. The effects on EDEs may also be exacerbated by the extraterritorial[2] nature of some reforms and extant regulations (Box 3.1). A recent report prepared by the Financial Stability Board (FSB) in coordination with the staff of the International Monetary Fund and the World Bank[3], highlights the potential adverse impact of the implementation of the reform measures on emerging markets and developing economies.

Capital Requirements of Banks under Basel III

3.5 India has issued the final guidelines on Basel III. The implementation of Basel III capital requirements will begin on January 1, 2013 and is expected to be completed by March 31, 2018.

3.6 Earlier FSRs have reported that banks in India will start from a position of strength in implementing the Basel III measures. Quick estimates place the additional capital requirement of banks on account of Basel III at ` 5 trillion, of which non-equity capital will be to the order of ` 3.25 trillion while equity capital will be to the order of ` 1.75 trillion[4]. Additional challenges could be posed by the recent trends in asset quality of banks, regulatory changes in restructuring guidelines and the proposed implementation of dynamic provisioning norms that may increase the provisioning requirements of the banking sector. The deterioration in the macroeconomic conditions could further add to asset quality pressures.

Migration to Advanced Approaches under Basel II

3.7 The guidelines on internal ratings based (IRB) approach for computing credit risk capital charge; the standardised approach (TSA) and advanced measurement approach (AMA) for operational risk; and internal models approach (IMA) for market risk have been issued. While three banks have applied to the Reserve Bank for accreditation for migrating to IMA under market risk, 15 banks have applied for migrating to IRB approach for calculation of credit risk capital charge. Further, 12 banks have applied for migrating to TSA, and nine banks have given letter of intention for migration to AMA for calculation of operational risk capital charge. One bank has been granted approval for migrating to TSA on 'parallel run' basis. Applications of the remaining banks are at various stages of examination.

3.8 The migration to advanced approaches, however, comes with inherent challenges as the process hinges on the sophistication of risk management systems, processes and culture as well as the availability of data; tools; methodologies; and necessary expertise in banks.

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[2] Extraterritoriality is the application of a local regulatory requirement (whether licensing or transactional) to firms or market participants beyond the jurisdiction enacting it, or imposition of substantive compliance, or reporting burdens of such requirements outside the enacting jurisdiction.

[3] http://www.financialstabilityboard.org/publications/r_120619e.pdf

[4] "*Basel III in International and Indian Contexts Ten Questions We Should Know the Answers For*", Inaugural Address by Dr. Duvvuri Subbarao, Governor, Reserve Bank of India at the Annual FICCI - IBA Banking Conference at Mumbai on September 04, 2012.

Box 3.1: Extraterritorial Implication of Regulations

The focus on addressing systemic risk at both the domestic and international level has led to a new dimension in terms of regulatory initiatives – extraterritoriality of regulations. As national authorities embark on efforts to avoid importing risks in an interconnected world and protect their respective economies, regulators often take a broad view of their regulatory perimeter. This, on occasions, results in an overarching reach of regulations making them applicable to entities beyond the home jurisdiction.

Extraterritorial application of regulations arise as legislation or regulation is developed at a national or regional level ahead of, or inconsistently with, a globally agreed standard. In addition to regulations prescribed by national authorities, there are some prescribed by multilateral organisations such as the Basel Committee on Banking Supervision (BCBS) or International Organisation of Securities Commissions (IOSCO), which are often a precursor to national regulatory initiatives. Despite efforts to ensure that global standards are adopted consistently across jurisdictions, national interests could take precedence as the transnational reach of certain recent regulations impinge on the sovereignty of other nations. Concerns are emerging about the potential costs of compliance requirements and the possibility of similar unilateral action by other countries leading to regulatory fragmentation.

Some notable regulations with significant extraterritorial implications include:

Foreign Account Tax Compliance Act (FATCA)

The objective of FATCA is to identify tax evaders among American tax payers and is made applicable to any non-US organisation that holds or manages customers' or affiliates' money. The provisions require the foreign financial institutions (FFIs) and non-financial foreign entities (NFFEs) to enter into a compliance agreement with the US Treasury and identify and report US accounts annually. The regulation has a sweeping reach as it does not mandate that such institutions should have a presence in the US. It imposes extensive due diligence and compliance requirements on foreign entities and stringent withholding tax in case of non-compliance. In addition, the reporting requirements could potentially conflict with some data privacy laws outside the US.

Margin requirements for OTC derivatives under the Dodd-Frank Rules

The proposed rules impose significant margin requirements for certain OTC derivative transactions. The requirements would have direct extraterritorial effect as they are made applicable to all such transactions if the transactions take place in the US or if any of the counterparties is controlled in any way by a US entity.

Solvency II

Solvency II is a risk-based regulatory regime that will apply to insurance establishments in the European Union. The Solvency II directive recognises the fact that the insurance industry is a global industry and therefore allows the European Commission to decide about the equivalence of a third country's solvency and prudential regime.

Registration Requirements under Rule 15(a) of the Securities Exchange Act, 1934 (US)

Rule 15(a) of the Securities Exchange Act provides that any person who induces or attempts to induce the purchase or sale of a security using mails or some other means of interstate commerce must register as a broker-dealer with the Securities and Exchange Commission (SEC), US. There is no explicit territorial limitation to this requirement of registration of broker-dealers and hence, the provision extends to foreign broker or dealers also. The Rule provides a limited set of exemptions to a foreign broker-dealer from the registration requirements. Due to the limited scope of such exemptions, the extant regulatory framework in the US does not permit solicitation and marketing of offshore equities in the US by any entity, unless such broker-dealer is registered with the SEC. This creates a significant challenge to the portfolio investments from the US in India particularly through the recently introduced Qualified Foreign Investors (QFI) scheme which allows foreign institutions as well as individuals to directly access the Indian securities market.

3.9 The advanced approaches under Basel II necessitate the use of complex internal models for the calculation of capital charge. Concerns have been raised that banks' modelling approaches are being used to optimistically calculate risk weights resulting in portfolios of similar risk being assigned varying amounts of equity capital. The complexity and opacity of such models add to the difficulties in scrutinising and assessing the capital adequacy ratios. In a recent report, the Bank of England has voiced concerns about the use of models for the aggressive application of risk weights resulting in capital positions of banks being

over-stated[5]. The Basel Committee is also evaluating the sources of material differences in risk weighted assets (RWAs) across banks in order to estimate the extent to which the differences are practice based rather than risk based and to assess whether the RWA calculations are consistent with the relevant Basel standards. The final report in this respect is expected in early 2013.

3.10 As an increasing number of banks migrate to advanced approaches, validation and accreditation exercise will assume significance (Box 3.2).

Assessing Operational Risk Capital

3.11 Against the backdrop of the global financial crisis, several high profile cases of frauds in banks, mainly involving traders in global banks, have surfaced and raised concerns that operational risk is emerging as a prominent risk for the banking sector. There are recent instances of banks being penalised for operational failures, under-scoring the fact that failure to manage operational risk can be expensive. These developments have focussed attention on the quantum of operational risk capital maintained by banks. There are concerns that under the standardised approaches under Basel II, the quantum of operational risk capital maintained by banks is linked to its revenue rather than being calibrated to the magnitude of operational losses incurred by the firm. Operational risk is recognised as one of the most difficult risks to measure and, even under the advanced approaches, capital requirements for operational risk are likely to be underestimated.

3.12 In the Indian banking system, measuring the extent of operational risks poses formidable challenges given the lack of historical data on operational loss events. Time series data is available only for the incidence of frauds. An analysis of such data indicates that losses incurred due to the incidence of frauds are

Box 3.2 : Challenges in Relying on Internal Models for Calculation of Capital Charge

Calculation of capital charge under the advanced approaches of Basel II places extensive reliance on internal models. However, concerns have emerged over the potential for adverse consequences from decisions based on incorrect or misused model outputs and reports.

Model risk can lead to financial loss, poor business and strategic decision making, or damage to a bank's reputation. The risks inherent in the use of model derived risk-sensitive weights are a case in point. Model selection or model calibration (particularly PD and LGD estimation) have been identified as potential drivers of RWA variation as the same asset gets rated differently by different banks, even within a jurisdiction.

Some jurisdictions have issued comprehensive guidance on effective model risk management. The US Supervisory guidance on model risk management issued in April 2011 identifies "effective challenge" of models as the central principle for managing model risk. Effective challenge depends on a combination of incentives, competence and influence. Such challenge can come from an internal source, such as model experts in the compliance and risk, or internal audit function; or in the form of external source, like consultants. The Prudential Regulation Authority (PRA), UK, has also identified challenges in use of internal model for the purposes of calculating regulatory capital requirements and expects models used to calculate capital requirements to be "conservative", failing which the PRA would call for adjustments to the model, or set capital floors. The European Insurance and Occupational Pensions Authority (EIOPA) in its consultation paper on guidelines for own risk and solvency assessment (ORSA), a Solvency II requirement, lays out detailed guidelines for firms using internal models. The paper calls for the ORSA process to consider whether the firm is exposed to any risks other than those addressed through the internal model and whether the internal model deals with the risks it covers appropriately.

Challenges are also posed by the fact that models cannot account for all kinds of risks. This is testified to by the recent operational risk events which indicate that "the risk of loss from failures by people and bank processes" could be rising. These challenges are further accentuated in banks where processes are complex. Recent high profile events have under-scored the fact that flawed risk models – one form of operational risk – can be expensive. Complex models can also facilitate frauds by enabling concealment of losses and short circuiting of risk controls.

[5] Bank of England Financial Stability Report, November 2012

rising for Indian banks in recent quarters (Charts 3.1 and 3.2).

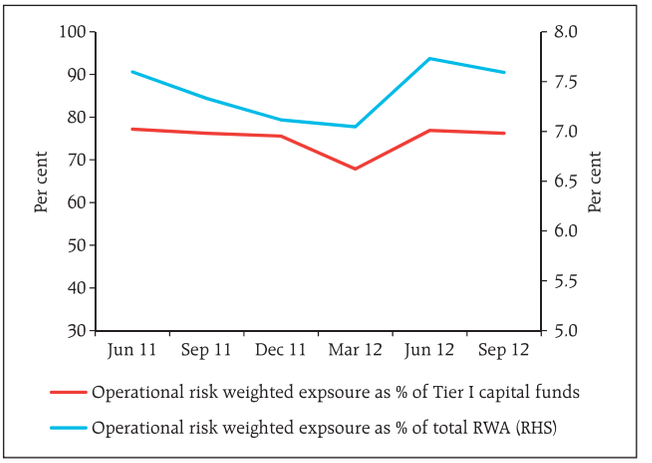
Identification Metrics for Financial Conglomerates (FCs)

3.13 A framework for dealing with D-SIBs that complements the work done so far towards dealing with global systemically important banks (G-SIBs) has been finalised as part of the global reforms agenda[6]. The framework comprises a set of 12 principles that focus on the assessment methodology and the higher loss absorbency (HLA) requirement for D-SIBs. The assessment methodology is based on the potential impact of a bank's failure on the domestic economy, which is determined in terms of bank-specific factors such as size, interconnectedness, substitutability/ financial institution infrastructure and complexity. The HLA requirement is expected to be met fully by Common Equity Tier1 (CET1) through an extension of the capital conservation buffer, in line with the treatment of the additional loss absorbency requirement for G-SIBs.

3.14 No Indian bank has been classified as a G-SIB. While, no specific mechanism for identification and monitoring of SIFIs/D-SIB presently exists in India, a mechanism for monitoring and oversight framework of FCs is in place since 2004-2005. An FC is defined as a cluster of entities belonging to a Group, if (i) any group entity coming under the jurisdiction of specified regulators and having a significant presence in the respective financial market segment; and (ii) the group having operations in at least one more financial market segment *viz.,* bank, insurance company, mutual fund, NBFC (deposit taking), NBFC (non-deposit taking) and primary dealer. Significant presence in the respective financial market segment is defined in terms of asset base (for banks and non-deposit taking NBFCs), turnover (for insurance companies), deposit base (for deposit taking NBFCs) and assets under management (for mutual funds).

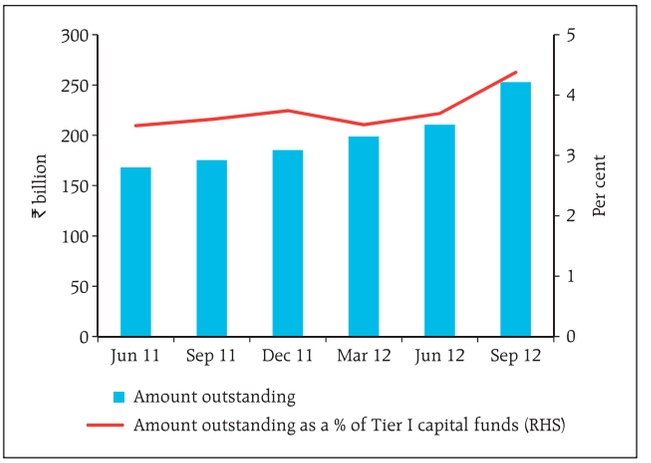
3.15 The current framework for identification of FCs is based only on the "size" of the financial sector entity. Little cognisance is taken of off balance sheet assets, payment system obligations, intra-financial

Chart 3.1: Operational Risk Weighted Exposures of the Banking System



Source: RBI Supervisory Returns

Chart 3.2: Amount Involved in Outstanding Cases of Frauds



Source: RBI Supervisory Returns

[6] http://www.bis.org/publ/bcbs233.htm

sector transactions, *etc.* The operations of non-banking finance companies like housing finance companies are not considered as part of any market segment. Further, the identification metrics do not factor in the impact of failure of an entity on the financial system. This system of identification could give rise to 'blind spots' with the potential of both Type 1 (treating an entity as an FC when it is not an FC) and of Type 2 (not identifying a financial sector entity as an FC when it is an FC) errors.

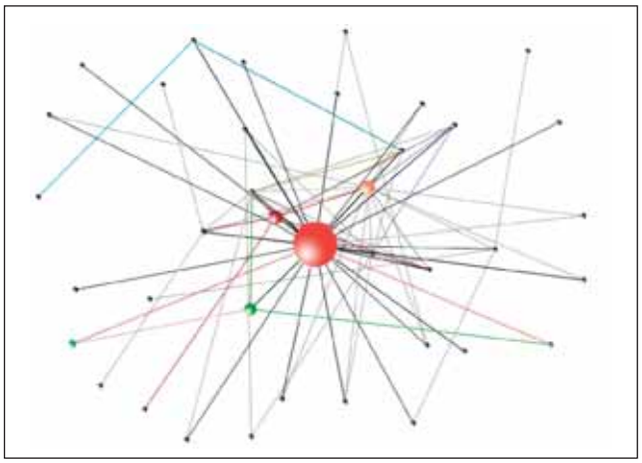
3.16 Going forward, an indicator based approach for the identification of FCs will need to be developed. The framework will need to factor in the work of the Basel Committee for D-SIBs as well as ongoing FSB work related to identification of systemically important insurance companies and identification of systemically important non-bank financial institutions (other than insurers and financial market infrastructures). Some of these FCs of which the bank is the parent entity, are likely to be identified as D-SIBs. An Inter Regulatory Forum for monitoring FCs set up by the Sub-Committee of the Financial Stability Development Council (FSDC) is examining the related issues.

Intra Group Transactions and Exposures (ITEs)

3.17 ITEs invoke supervisory concerns due to the possibility of regulatory arbitrage and risk concentrations within the Group. With different approaches to setting limits or defining concentrations in entities within a Group or where there are unregulated entities, the differences in requirements can result in regulatory arbitrage. ITEs could also lead to drain on capital and double or multiple gearing which could impinge adversely on the banking group. The presence of ITEs can potentially complicate the resolution of the regulated entities within a troubled or failing conglomerate (Chart 3.3).

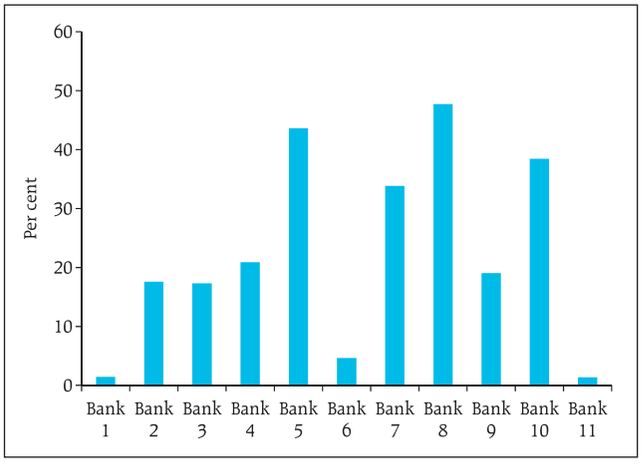
3.18 In the Indian context, an analysis of the magnitude of intra group exposures as on June 30, 2012 in the case of 11 large banks (including some FCs) indicates that such exposures comprise a significant percentage of the capital funds of the banking company in some cases (Chart 3.4).

Chart 3.3: Intra Group Exposures in case of One Large Financial Conglomerate[7]



Source: RBI Staff Calculation

Chart 3.4: Intra Group Exposures as a Percentage of Capital Funds of the Bank in the Group



Source: RBI Supervisory Returns

[7] The chart represents the exposures (fund and non-fund based between different group companies of a financial conglomerate as on June 30, 2012). The balls in the chart represent the group companies (with the red ball centre representing the banking company in the FC) while the lines represent the exposures. The size of the balls represents the share of the entity in total intra group exposures of the FC.

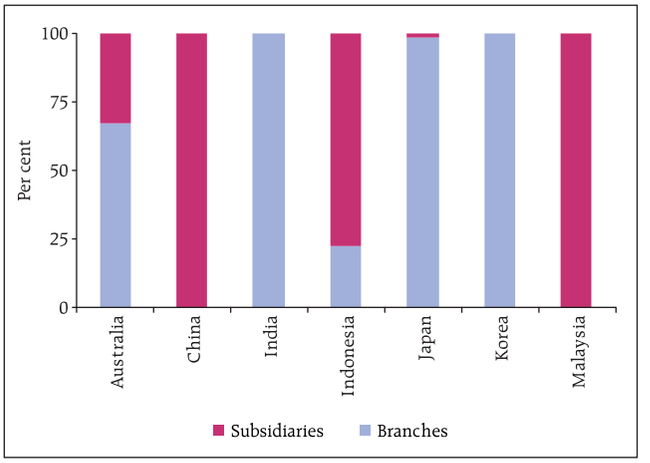
3.19 Keeping in view the risks posed by ITEs, the Reserve Bank has issued draft guidelines in August 2012 to ensure that banks maintain arms length relationship in their dealings with the Group entities. Both quantitative limits for the financial ITEs[8] and prudential measures for the non-financial ITEs[9] have been proposed so as to contain concentration and contagion risk arising out of ITEs. Recent amendments to the banking legislations granting powers of consolidated supervision will further equip the Reserve Bank to, *inter alia*, monitor such risks (Box 3.3).

Subsidiarisation of Foreign Banks

3.20 The increasing complexity and interconnectedness of cross border banking groups, along with the absence of effective resolution regimes, has led to an emerging debate about the preferred cross-border banking structure, *viz.*, "subsidiarisation" as opposed to foreign banks operating as branches in the host country. Different models/ combinations of cross border banking structures co-exist in different regions (Chart 3.5).

3.21 From the perspective of policymakers-both home and host authorities, subsidiarisation has important

Chart 3.5: Share of Branches and Subsidiaries of Foreign Banks to Total Assets – as on end-2008



Source: "Subsidiaries or Branches: Does One Size Fit All?", IMF Staff Discussion Note, March 2011

Box 3.3: Banking Laws (Amendment) Bill, 2012

The Banking Laws (Amendment) Bill, 2012, has been passed by both houses of Parliament to amend the Banking Regulation Act, 1949, the Banking Companies (Acquisition and Transfer of Undertakings) Act, 1970, the Banking Companies (Acquisition and Transfer of Undertakings) Act, 1980 and to make consequential amendments in certain other enactments.

The Bill empowers the Reserve Bank to ensure that banks are owned and managed by persons meeting fit and proper criteria. It gives powers to the Reserve Bank to supersede the Board of Directors of a banking company and appoint an administrator for a period of 12 months with the objective of preventing the affairs of any banking company being conducted in a manner detrimental to the interest of the depositors or any banking company or for securing the proper management of any banking company.

The Bill also empowers the Reserve Bank to supervise banks on a consolidated basis including their subsidiaries and associate enterprises, to ring fence the banking entity in the group from contamination by associated financial and non financial entities.

Further the amendment provides for setting up of a Depositors Education and Awareness Fund by taking over unclaimed funds lying in inoperative accounts for ten years or more with banks and utilise the same for promotion of depositors' interests and for such other purposes as may be specified by the Reserve Bank. The Bill will also facilitate consolidation of co-operative banking sector and viable functioning of co-operative banks in a sound and healthy manner without detriment to the interests of the stakeholders.

[8] Financial ITEs are those whose outcomes can be associated with financial flows manifesting in the form of assets, liabilities and/ or revenue transactions. Examples of financial ITEs are fund-based and non-fund based transactions.

[9] Non-financial ITEs refer to operations arising out of 'matrix' management facilitating control/ effective risk management over a business segment or a line of activity across a number of legally independent entities. Examples of non-financial ITEs are back-office arrangements, cross selling of products, *etc.*

stability implications. Home authorities might prefer the subsidiary model when their banks expand into risky cross border business environments. Host authorities might also prefer the subsidiary model, because the problems of the parent would not be passed down to the affiliate. Potential down side risks may arise if subsidiaries promoted by foreign banks become dominant in the domestic financial system. Anecdotal evidence suggests that, in countries where such subsidiaries had a large presence, they tended to substantially curtail their operations or withdraw from the host country when there were adverse developments in their home country. In addition, setting up of subsidiaries will not necessarily ensure unconditional support from the parent bank.

3.22 The Reserve Bank released a *Discussion Paper on Presence of Foreign Banks in India* in January 2011. The paper proposes mandating the subsidiary form of presence (*i.e.* wholly owned subsidiary (WOS)) of foreign banks at the entry level itself under certain conditions and subject to certain thresholds. Foreign banks which enter as branches would also be mandated to convert to WOS once they meet the conditions/ thresholds or become systemically important.

Convergence of Accounting Standards

3.23 The Ministry of Corporate Affairs (MCA), Government of India had announced that banks in India will transition to the International Financial Reporting Standards (IFRS) converged Indian accounting standards (Ind AS) with effect from April 1, 2013[10]. The schedule was announced keeping in view the then proposed International Accounting Standards Board (IASB) timeline (June 2011) for finalisation of IFRS 9 and the implementation time required after the finalisation of a standard. However, the IASB has deferred the mandatory date of its new financial instruments standard (IFRS 9) from 2013 to 2015 and has issued an Exposure Draft in November 2012 proposing limited modifications to the previously finalised portion of IFRS 9 pertaining to classification and measurement of financial assets. Further, the US Financial Accounting Standards Board (FASB) has recently decided to explore a revised approach to impairment (loan loss provisioning) model that could differ from the IASB's "three bucket" impairment model[11]. These developments at the international level have added to the complexity and uncertainty of the convergence process for domestic banks.

Shadow Banking System

3.24 Considerable progress has been made globally towards the finalisation of the policy framework for strengthening the regulation of the shadow banking system and to mitigate potential systemic risks (Box 3.4).

3.25 The broad objective of the global reforms agenda is to ensure that the shadow banking system is subject to appropriate oversight which addresses the risks posed by the sector. The approach, however, recognises that, in many jurisdictions, the shadow banking system can play a useful economic role and lead to efficiency gains, for example, due to:

- diversification of risk and limiting risk concentration;
- economies of scale;
- some specialised finance companies being more efficient than banks in serving certain market segments; and
- financial inclusion considerations.

3.26 While the policy framework has been set out for regulating and monitoring the shadow banking system, the final recommendations are to be developed in a number of areas. The emergent policy framework will

[10] In February 2011, the MCA published 35 IFRS converged Indian Accounting Standards (Ind AS) stating that their implementation date would be notified later after resolving all issues including those relating to taxation. Subsequently, there has been no further announcement from the MCA on the implementation date. Consequently, entities that were scheduled to transition to IFRS from April 1, 2011 and April 1, 2012, as per the MCA's Roadmap, have not done so.

[11] The IASB impairment model places financial assets into three categories (or 'buckets') for the purpose of assessing the timing of recognition of expected losses. The impairment loss recognised would vary depending on which category an asset is allocated to. Generally, 12 months of expected losses are recognised for financial assets placed in the first bucket with life time losses recognised on transfers to buckets 2 and 3. However, the finer details of the impairment model are still being deliberated by the IASB and an Exposure Draft on impairment is expected only in 2013.

Box 3.4: Strengthening Regulation of the Shadow Banking System[12]

The FSB has recently published a series of reports setting out recommendations for effective monitoring of the shadow banking sector.

Banks' interactions with shadow banking entities

Since the crisis, a number of measures have been / are being implemented (through Basel 2.5 and Basel III) that aim to strengthen the resilience of the banking sector against some risks posed by shadow banks. These measures include increased capital requirements for banks' exposures to re-securitisation and to financial institutions; enhanced internal capital adequacy assessment process for securitisation risk and enhanced disclosure requirements related to securitisation. Going forward, the Basel Committee is working towards making further refinements to the regulatory treatment of banks' exposures to shadow banking entities including developing a large exposure regime and introducing a risk sensitive capital treatment for banks' investment in the equity of funds.

Money market funds (MMFs)

Given the demonstrated potential for systemic risk among MMFs, especially among funds offering stable or constant net asset value (NAV) to their investors, policy recommendations have been issued which provide a basis for common standards for the regulation and management of MMFs across jurisdictions. The recommendations cover a range of issues including valuation, liquidity management, use of credit ratings, disclosures and use of repos.

Other shadow banking entities

Given the high degree of heterogeneity and diversity in business models and risk profiles across the non-bank financial space (other than MMFs), an economic function-based (*i.e.* activities-based) perspective has been adopted to mitigate risks posed by these entities. A framework of five economic functions, as under, has been set out for the purpose:

- management of client cash pools with features that make them susceptible to runs;
- loan provision that is dependent on short-term funding;
- intermediation of market activities that is dependent on short-term funding or on secured funding of client assets;
- facilitation of credit creation; and
- securitisation and funding of financial entities.

Securitisation

Since the crisis, many regulatory reforms, including reforms related to retention requirements and measures to enhance transparency and standardisation of securitisation products, have been undertaken to address the systemic vulnerabilities and incentive problems associated with securitisation. Further, possible policy actions have been identified towards convergence and enhanced monitoring of risk retention requirements, improving disclosures by issuers and encouraging standardisation of securitisation products.

Securities lending and repos

To address financial stability risks arising from practices in the securities lending and repos market, a series of policy recommendations are being developed. These encompass improved reporting to regulators and end-investors, improving transparency and disclosures, addressing risks associated with re-investment of cash collateral and with re-hypothecation of client assets, introducing minimum standards for haircut practices, strengthening collateral valuation and management practices, exploring the feasibility of establishing central clearing and addressing bankruptcy law treatment of securities lending and repo transactions.

also need to remain vigilant to the strongly adaptive nature of the shadow banking system which constantly innovates to developments in the financial and regulatory landscape.

3.27 In the Indian context, a Working Group on "Issues and Concerns in the NBFC Sector" set up by the Reserve Bank had made a series of recommendations to address issues relating to regulatory arbitrage and systemic risk, so as to create a strong and resilient non-banking financial sector. Based on recommendations made by the Working Group, the Reserve Bank of India has, in December 2012, issued draft revised guidelines related to entry point norms, principal business criteria, prudential regulations, liquidity requirements for NBFCs and corporate governance. The draft guidelines have proposed ample transition

[12] Strengthening Oversight and Regulation of Shadow Banking: An Integrated Overview of Policy Recommendations", Financial Stability Board, November 2012

time to bring the new regulatory framework into existence so as to ensure that the revised regulations are implemented in a non-disruptive manner.

Growth Trends in the Non-Banking Financial Sector

3.28 In the Indian context, the 'shadow banking system', as it existed in much of the developed world is largely irrelevant as the regulatory perimeter of the country is relatively wide, encompassing most non-banking financial entities. NBFCs are regulated by the Reserve Bank, while insurance companies and asset management companies are regulated by IRDA and SEBI respectively.

3.29 Over the years, the NBFC sector has seen a fair degree of consolidation, leading to the emergence of larger companies with diversified activities. There has been a gradual, regulation induced reduction in the number of deposit taking NBFCs from nearly 1500 in March 1998 to less than 300 currently. No new NBFC has been permitted to commence raising public deposits since 1997.

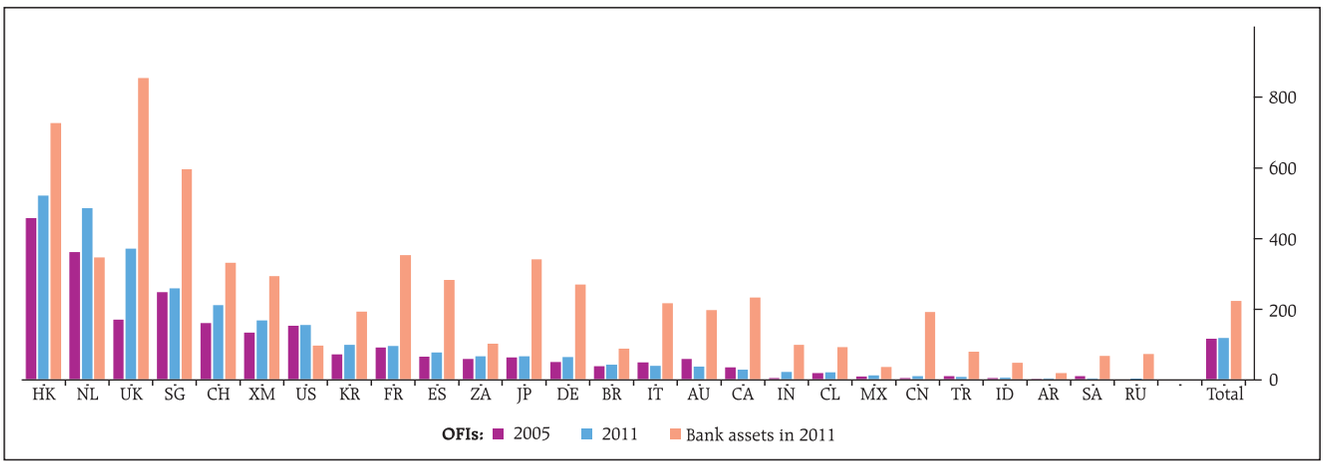
3.30 The size of the non banking financial sector, at 21 per cent of GDP, is relatively small compared to the global average. Post crisis, however, the growth rate of "other financial intermediaries[13]" has been relatively higher than peer economies including Mexico, Brazil, South Africa and China. While a part of the growth in this segment can be attributed to structural factors such as the financial deepening of the economy, the underlying trends will need to be closely monitored especially in view of the interdependencies between the banking and non-banking financial sector in the country, as discussed in Chapter II (Charts 3.6 and 3.7).

Regulatory Coverage of the Non-Banking Financial Sector

3.31 There are, however, some gaps in terms of regulatory coverage and data availability in respect of the shadow banking system in the country. For instance,

- Government sponsored NBFCs remain outside the regulatory and supervisory framework for NBFCs;
- There is little regulatory oversight over the large quantum of funds handled by post offices, employees' provident funds or government pension schemes; and
- There are regulatory ambiguities/ gaps in case of entities operating collective investment schemes such as chit funds, multi-level-marketing schemes, *etc.*

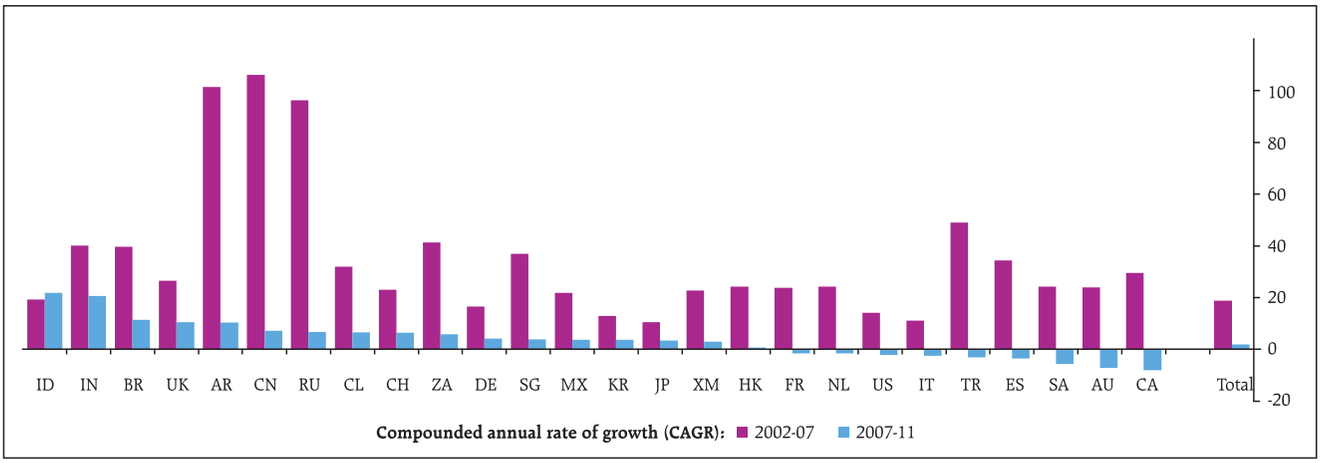
Chart 3.6: Size of Other Financial Intermediaries (as a percentage of GDP, by jurisdiction)



Source: " Global Shadow Banking Monitoring Report 2012", FSB, November 2012

[13] As defined in the FSB report, "Global Shadow Banking Monitoring Report 2012", November 2012, "Other Financial Intermediaries" include "NBFIs that cannot be categorised as insurance corporations or pension funds or public sector financial entities". In the Indian case, this primarily refers to the NBFC sector and the liquid mutual funds.

Chart 3.7: Average Annual Growth of Other Financial Intermediaries Sector Pre- and Post-Crisis (in per cent, by jurisdiction)



AR = Argentina; AU = Australia; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IN = India; IT = Italy; JP = Japan; KR = Korea; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; XM = Euro area; ZA = South Africa.

Source: " Global Shadow Banking Monitoring Report 2012", FSB, November 2012

3.32 Plugging the data gaps will be necessary for a holistic assessment of the size of the non banking financial segment in the country and of the systemic risks posed by the segment. To address these issues, a Working Group with representation from all the financial sector regulators is attempting to "macro map" the shadow banking sector in the country.

Bancassurance

3.33 Banks account for a significant share in the distribution of products in the life insurance segment. IRDA issued, in October 2012, a revised exposure draft on bancassurance. The proposed regulations allow banks to sell insurance products by either becoming a broker or a corporate agent. Banks selling insurance products offer several benefits *viz.*, it encourages customers of banks to purchase insurance policies and further helps in building better relationship with the bank; reach of insurance products could improve through the widely distributed networks and better marketing channels of banks; and the increased competition could facilitate better premium rates and services for the customer. However, as highlighted in the previous FSR, many instances of mis-selling of insurance products through this channel have been evidenced. The exposure draft seeks to leverage on the benefits of bancassurance while addressing the concerns of mis-selling through stipulations such as imposition of a ceiling on number of tie ups a bank can enter into as bancassurance agent, improved grievance redressal systems, prescription of a code of conduct and enhanced due diligence and compliance of KYC (Tables 3.1 and 3.2).

Table 3.1: Premium under Life Sector: Bancassurance Vs Other Channels

Financial Year	Individual Category				Group Category			
	Banks		Others		Banks		Others	
	No. of Policies (million)	Premium (` billion)	No. of Policies (million)	Premium (` billion)	No. of Schemes	Premium (` billion)	No. of Schemes	Premium (` billion)
2009-10	2.1	86.9	52.3	758.9	444	6	28224	272.8
2010-11	1.9	110.7	46.7	729.5	1834	13.2	28765	418.7
2011-12	2.2	97	42	551.1	936	31.0	30593	459.8

Source: IRDA

3.34 Several aspects of the exposure draft will need careful consideration. Extant regulations do not permit banks to become insurance brokers. Banks assuming the role of insurance brokers may also lead to conflict of interests where the bank is also the promoter of an insurance company. Further, some provisions of the exposure draft, if implemented, may expose the banks to reputational risks.

Payment and Settlement Systems

3.35 The payment and settlement systems continued to function in a robust manner with increased usage of electronic modes of transaction settlement (Charts 3.8 and 3.9). Regular disaster recovery tests for large value payment systems testified to the robust arrangements in place for business continuity of such systems.

3.36 The Reserve Bank released its Payment Systems Vision Document for the three year period (2012-2015) in June 2012. The document reaffirms the Reserve Bank's commitment towards providing safe, efficient, accessible, inclusive, interoperable and authorised payment and settlement systems for the country.

Margin Movements in Foreign Exchange Settlements

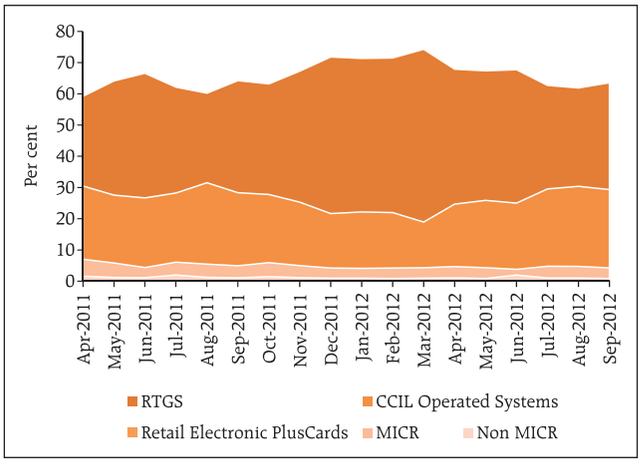
3.37 The global financial crisis has brought to the fore the risks to financial stability posed by excessive procyclicality of the financial system which could amplify swings in the real economy and exacerbate market stress and volatility. In the case of OTC derivatives market, procyclicality could be caused by the correlation between changes in risk management practices (margins, haircuts) and business or credit cycle fluctuation. The margining policies of central counterparties (CCPs) and exchanges acquire particular importance in this context. CCPs impose margins in order to protect the systems from potential future losses arising from counterparty failures. But, if the assessment of potential future losses is based purely on volatility, there will be a sharp increase in margins if market volatility were to increase. Key considerations enunciated in the recently issued Principles for Financial Market Infrastructure[14] on collateral and margins, emphasise the need to establish stable

Table 3.2: Premium under Non Life Sector: Bancassurance Vs Other Channels

Financial Year	Banks		Others	
	No. of Policies (million)	Premium (` billion)	No. of Policies (million)	Premium (` billion)
2009-10	6.5	2819.3	82.5	35650.0
2010-11	6.5	2849.3	101.2	44258.4
2011-12	7.1	3273.3	81.6	54690.7

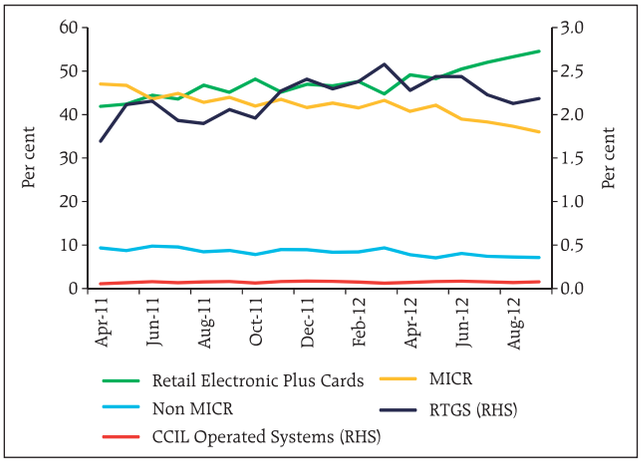
Source: IRDA

Chart 3.8: Percentage Distribution of Settlement Systems (in value)



Source: RBI

Chart 3.9: Percentage Distribution of Settlement Systems (in volume)



Source: RBI

[14] http://www.bis.org/publ/cpss101.htm

collateral and margining policies that reduce the need for procyclical adjustments.

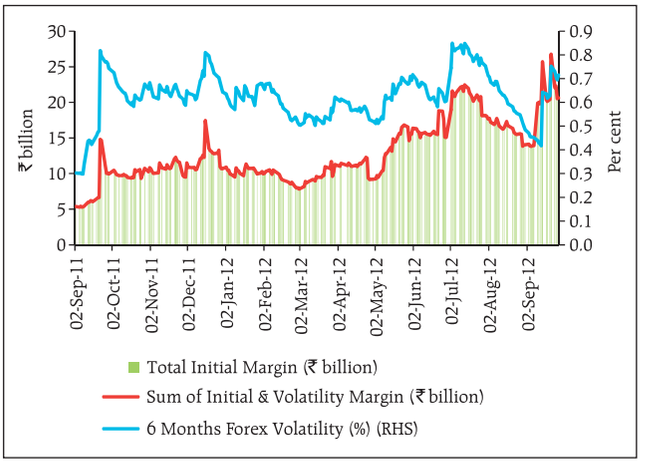
3.38 An analysis of the trends in foreign exchange market volatility and margins collected by the Clearing Corporation of India Limited (CCIL) over the last one year provide some indications of procyclicality. CCIL's stipulation of a minimum margin as part of its initial margin computation could, however, reduce the procyclicality impact to some extent. Recent refinements to the initial margin computation carried out by CCIL to reflect the increased volatility of forward premium in USD/INR foreign exchange market have resulted in significant increase in minimum margin requirements. This could further mitigate the adverse impact of such procyclicality. Nonetheless, the underlying trends in margins will need to be closely monitored (Charts 3.10 and 3.11).

3.39 The above issues are equally relevant for trading on exchanges. A recent assessment by SEBI found that initial margin prescriptions by CCPs for equity derivatives and currency futures trades were adequate to cover daily volatility of prices/exchange rates. The potential procyclicality, if any, of such margin prescriptions may also need to be assessed and monitored.

Exposure of Equity Market CCPs to Banks

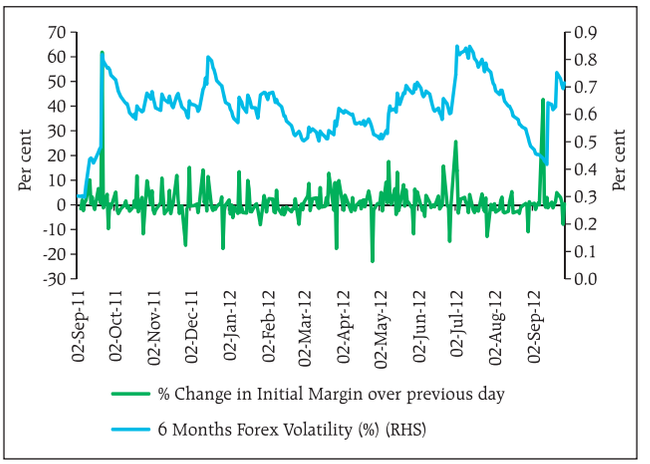
3.40 Previous FSRs have discussed the interdependencies in the domestic payment and settlement systems. CCPs in the equity market accept margins/ contribution to the settlement guarantee fund (SGF) in the form of bank guarantees and securities (which may in turn be issued by banks) amongst others. This exposes the CCPs to credit risk *vis-à-vis* the banking sector. Prudential regulatory limits are in place to prevent excessive concentration of the CCPs to any one bank or to any particular class of banks. The exposure of the National Securities Clearing Corporation Limited (NSCCL) and the Bombay Stock Exchange (BSE) to the banking sector is well diversified with their exposure to the top five banks standing at 18.5 per cent and 24.1 per cent, respectively, of total exposure to the banking system. However, four banks are common in this list of top five banks for both NSCCL and BSE, indicating that any disturbance emanating from any one of these four banks could adversely impact both the CCPs concurrently (Table 3.3). Though

Chart 3.10: Forex Market Volatility and Margin (Initial and Volatility Margins) collected by CCIL



Source: CCIL

Chart 3.11: Forex Market Volatility and Change in Initial Margins collected by CCIL



Source: CCIL

Table 3.3: Exposure of NSCCL and BSE to Banks

	Exposure as a % of SGF	
	NSCCL	BSE
Bank 1	6.8	8.5
Bank 2	5.7	5.4
Bank 3	3.2	3.0
Bank 4	1.7	5.6

Source: SEBI

the exposures of the CCPs to the banks are well within the prudential exposure limits prescribed by SEBI, the interconnectedness between the CCPs and banks needs to be monitored.

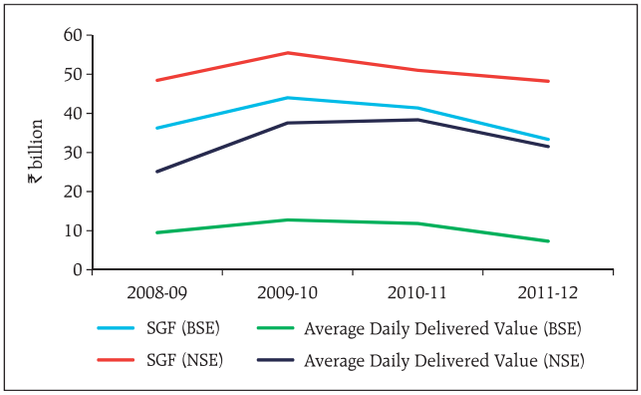
Settlement Guarantee Funds of Equity Clearing Corporations

3.41 "Owned funds" and the SGFs play a critical role in the risk management framework of a CCP which guarantees settlement of net obligations arising out of trades settled by it. The risk management framework of the CCP will therefore need to ensure that sufficient funds are available with it to meet the obligations of its members, including the member with the largest net debit position, should it default. In the case of equity clearing corporations in the country, the broad framework for risk management is prescribed by SEBI.

3.42 The funds/resources available to the CCP are typically employed in a hierarchical order in the case of a default by a member. For example, in the case of the NSCCL, the initial recourse is made to the margin contributed by the defaulting member and any contribution or deposit made by or bank guarantee arranged by the member to the SGF. If these funds are not sufficient, then other funds are sourced *e.g.* the amount of security deposit, if any, made by the defaulting member to the specified exchange; or the fines, penalties, interest on delayed payment, *etc.*, if any, available with the CCP. Thereafter, the earnings of the CCP are used following which the amount of contribution and deposit made by all categories of clearing members to the SGF in proportion to the total contribution and deposit made by each clearing member are utilised.

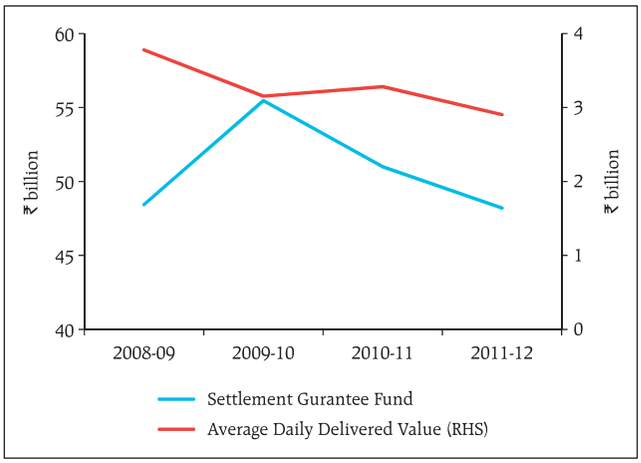
3.43 An analysis of the SGF available with the major equity exchanges *viz.*, NSE and BSE for cash and the derivatives segment indicates that, in most cases, the quantum of SGF is sufficient to cover the average daily delivered value. SEBI's recent measures in mandating all stock exchanges to transfer 25 per cent of their profits to the SGF of the CCPs where their trades are settled, will further buttress the risk management framework of the CCPs (Charts 3.12 to 3.14).

Chart 3.12: Settlement Statistic for Cash Market in BSE and NSE



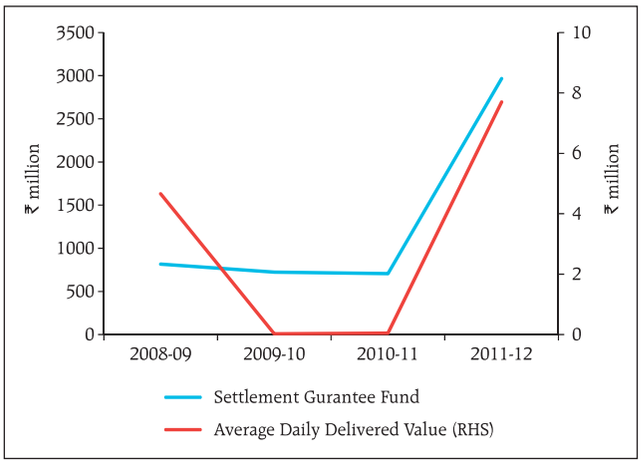
Source: SEBI

Chart 3.13: Settlement Statistics for Equity Derivatives Market of NSE



Source: SEBI

Chart 3.14: Settlement Statistics for Equity Derivatives Market of BSE



Source: SEBI

Progress in OTC Derivative Reforms

3.44 In October 2012, the FSB published its fourth progress report on OTC Derivatives Market Reforms[15]. The Report points to substantial progress towards implementation of the agreed reform measures *viz.,* electronic trading and/or central clearing of all standardised OTC derivative contracts by end-2012; and reporting of OTC derivative contracts to trade repositories (TRs); imposition of higher capital requirements for non-centrally cleared contracts. However, it is now clear that the agreed deadline of end-2012 for full implementation of the reform measures will not be met.

3.45 The Report indicates, subject to limitations of data, that approximately 10 per cent of outstanding credit default swaps (CDS) and 40 per cent of outstanding interest rate derivatives were centrally cleared as of end-August 2012. It estimates that while transaction information on well over 90 per cent of OTC interest rate and credit derivative contracts is being reported to TRs, only around 50 per cent of foreign exchange derivative transactions are being reported.

3.46 Going forward, a number of challenges remain in achieving complete implementation of the OTC derivative reforms, especially in ensuring that all standardised OTC derivative transactions are cleared centrally (Box 3.5).

Box 3.5: Challenges in Migrating to Central Clearing

Globally, there is widespread acceptance of the broad objective that OTC derivative products have to migrate to central clearing. Within the ambit of this broad objective, however, there is recognition of the fact that only products meeting certain conditions can migrate to central clearing. In particular, the features of the product should facilitate management of the risks of the product by a CCP. These features include standardisation; relative lack of complexity in contract terms; sufficient market liquidity; and readily available pricing information. There is, thus, a need for careful assessment and definition of the product scope for mandatory migration to central clearing.

There are also divergent views about the participants to be included under the mandatory central clearing requirement. Views have emerged that the mandatory central clearing requirements should apply only to participants which pose systemic risk and that exemptions/carve outs could be considered for smaller users of derivatives, especially non-financial entities. There are also fears that CCP clearing will result in exposures being concentrated in a small number of clearing banks leading to increased systemic risk in case of failure of a clearing member.

A large number of operational issues are also arising. These include issues related to inter-operability across different CCPs in the same jurisdiction and across CCPs in different jurisdictions, cross margining and netting. Each of these issues may, in turn, change the risk profile of individual CCPs while potentially posing systemic risks, which will need to be assessed and managed. There are also concerns arising from legal complexity, regulatory uncertainties and inconsistencies, applicability of insolvency regimes and of the default management processes of CCPs and potential increase in collateral requirements.

Yet another set of issues relate to cost considerations. On the one hand, substantial costs are likely to be incurred in providing for the technological and other resources for setting up CCP arrangements and for establishing links and interfaces. On the other, there is also a general consensus among market participants that central clearing is likely to increase the cost of dealing in OTC derivatives. There are fears that the regulatory changes being envisaged for the OTC derivatives market may result in the market itself getting impaired/killed in the medium to long run.

There are views that benefits from central clearing are unlikely to accrue to market participants in the short run even though, in the long run, there are benefits in terms of increased market efficiency as well as lower risks of instability. Regulators around the world are, therefore, exploring the possibility of either mandating the migration to central clearing or incentivising it, or both. The Basel III capital rules, for example, will create an incentive to move to central clearing because exposures to a CCP will generally attract a lower capital charge than other bilateral exposures.

It is also clear that implementation of the G20 reform measures will increase concentration risks *vis-à-vis* the CCPs. It will, thus, be critical to ensure the compliance of CCPs with the four "safeguards" identified by the FSB for a resilient and efficient framework for central clearing: (i) fair and open access by market participants to CCPs, based on transparent and objective criteria; (ii) cooperative oversight arrangements between all relevant authorities, both domestic and international, that result in robust and consistently applied regulation and oversight of global CCPs; (iii) resolution and recovery regimes that ensure the core functions of CCPs are maintained during times of crisis and that consider the interests of all jurisdictions where the CCP is systemically important; and (iv) appropriate liquidity arrangements for CCPs in the currencies they clear.

[15] http://www.financialstabilityboard.org/publications/r_121031a.pdf

3.47 With regard to margin requirements for non-centrally cleared derivative transactions, there are concerns that the greater collateralisation of such transactions may, in turn, lead to new risks. Margin requirements on non-centrally cleared derivative transactions will mitigate counterparty risks but the underlying collateral may by itself be a source of credit and liquidity risks. There are also concerns about the systemic implications of increased collateral requirements, especially at a time when other regulatory reforms (*e.g.* Basel III) will also impose demands on similar high quality, liquid collateral.

3.48 Significant progress has been made in implementing the OTC derivative reform measures in the domestic economy. In July 2012, a Trade Repository (TR) for OTC derivative product was launched and, in two phases, reporting of all major foreign exchange OTC derivatives to the TR has commenced. These arrangements will be extended, in phases, to cover foreign currency OTC derivative trades between banks and their clients under a suitable protocol to ensure confidentiality of client trades as also interest rate derivative products including client trades in rupee interest rate swaps (IRS).

3.49 Following the recommendations of the Working Group on Enhancing Liquidity in the Government Securities and Interest Rate Derivatives Markets[16], it has been decided to standardise IRS contracts to facilitate centralised clearing and settlement of these contracts.

3.50 Infrastructure for the central clearing and guaranteed settlement of foreign exchange forward transactions in the US dollar / Indian rupee segment from the trade date to the settlement date has been in place since December 2009 for inter bank transactions. IRS and forward rate agreements (FRA) in the Indian rupee, which form the bulk of interest rate derivative transactions in the country, are currently being centrally cleared in a non-guaranteed mode. Though, it is not mandatory for market participants to clear their trades through CCP, more than 70 per cent of IRS trades are cleared through CCP.

3.51 Guaranteed clearing of foreign exchange forward transactions in the US dollar / Indian rupee segment has been mandated and the migration of transactions in this segment to guaranteed clearing is likely to commence shortly. An "in principle" decision to bring IRS and FRA transactions in the Indian rupee within the ambit of guaranteed settlement has been taken. The risk management framework and procedural aspects proposed by the central counterparty are currently being examined.

3.52 Mandatory guaranteed clearing will result in the exposures of banks, which are currently spread across a large number of counterparties, being concentrated against the central counterparty. These exposures are required to be calculated using the current exposure method (the sum of gross positive MTM and potential future credit exposure) and will be subject to the extant exposure limits which prescribe a single borrower exposure limit of 15 per cent of the capital funds of the bank. Mandating settlement of a larger number of derivative products through CCIL is, thus, likely to result in banks' exposures *vis-à-vis* CCIL breaching the single borrower limit. Given the general consensus that migration to guaranteed clearing will increase settlement costs for participants, incentivising banks to move to guaranteed clearing in the Indian context may also be difficult.

3.53 Several options could be explored for addressing these issues *viz.*, designing a suitable exposure framework for CCIL which addressed the issue of the single borrower limit; taking recourse to the provisions of the Payment and Settlement Systems Act, 2007 (which defines netting and provides legal recognition for the procedures adopted by the system operator provided the same are approved by the Reserve Bank when it authorises such a system) to permit netting of exposures for capital calculations; examining setting up of additional CCPs; *etc.* CCIL's eligibility to be treated as a qualified CCP under the new framework issued by the Basel Committee which provides for concessional capital treatment to bank exposures to qualified CCPs would also need to be examined in this connection.

[16] The Working Group on Enhancing Liquidity in the Government Securities and Interest Rate Derivatives Market (Chair: R. Gandhi, Executive Director, Reserve Bank of India) submitted its report in August 2012 (http://www.rbi.org.in/scripts/PublicationReportDetails.aspx?UrlPage=&ID=677#L1)

Safety Net Arrangements

3.54 The global financial crisis illustrated the importance of effective depositor protection arrangements and also revealed several weaknesses in extant depositor protection systems. As an immediate response to the financial crisis, several countries increased their insurance coverage limits and some even extended blanket deposit guarantee as a temporary measure. Many countries are overhauling the design of deposit insurance system to be able to make quick payout arrangements by improving access to depositor information on the lines of single customer view of deposits as in the US. In several countries, initiatives are underway towards making deposit insurance an integral part of the safety net framework. The initiatives are primarily aimed at ensuring the proactive and early involvement of deposit insurance agency in resolution of weak/ failing banks.

3.55 Several issues, as under, pertaining to deposit insurance in India have been highlighted in previous FSRs:

(i) The coverage levels were low by international standards and have remained unchanged since May 1993. The DICGC has submitted a proposal to the Government of India for increasing the cover.

(ii) DICGC provides insurance cover to a heterogeneous range of banks whose failure rates differ. However, as premium is being charged at a uniform rate, this leads to cross-subsidisation and raises moral hazard issues. As the risk-based rating system has not evolved in India, it may be difficult to migrate to risk-based premiums. DICGC is, however, considering implementing a differential premium system based on available supervisory ratings.

(iii) DICGC has been facing delays in obtaining depositor information from the liquidators of failed co-operative banks, thus leading to delays in making payments to depositors. It has also been observed that some liquidators were not prompt in making payment to depositors after the claim was settled by DICGC. Both these have led to delays in making payments to depositors. In order to resolve the problem, DICGC has initiated steps to make direct payment to depositors and for expediting reimbursement to depositors along with technology upgradation.

(iv) A bank resolution framework is yet to evolve in India. The legal framework governing bank resolution is spread over a large number of laws and regulations, making the framework complex and non-transparent. A high level Working Group set up by the Sub Committee of the FSDC is examining the related issues.

Financial Stability and Development Council (FSDC)

3.56 The FSDC and its Sub Committee continued to provide focussed attention to potential risks to financial stability including, *inter alia*, the risks from a potential downgrade of the country's rating; the concerns arising from the elevated demand for gold in the country; and the external sector vulnerabilities of the country. The Sub Committee commenced work towards setting up an effective mechanism for the monitoring of FCs and putting in place an effective resolution regime for all financial institutions in the country. Significant initiatives towards greater financial inclusion and literacy were set in motion by the Sub Committee, as discussed in paragraph 3.78.

Product Innovations in India

3.57 Financial innovation is not an end in itself, but instead, a means to an end of sub-serving the real sector and in that sense it is consistent with, and a natural fit to, public policy purpose of "financial sector-real sector balance". It was the unsustainable "financial sector-real sector imbalance" due to certain financial innovations that was the real cause of the last global financial crisis[17]. Opacity and complexity of OTC derivatives have time and again raised concerns on suitability and appropriateness of the products sold in the market.

[17] Sharma, V.K. (2012), "**The Financial Innovations That Never Were"**, Keynote Address delivered at Finnoviti 2012 organised by Banking Frontiers, on November 8, 2012, Mumbai.

3.58 In India, most of the innovations in the market have been spearheaded by the regulators in their efforts to develop the markets and also ensure consumer protection. New products in derivative segments in equities, foreign exchanges *etc.* have been well received, and market volumes and widespread usage are indicative of this. The bid-offer spreads also indicate that liquidity in these markets is reasonably high.

3.59 In this context, an analysis was undertaken into the reasons for the skewed response to some of the interest rate derivative products introduced in the Indian markets. Interest Rate Swap (IRS), in India, is primarily used by a narrow set of foreign banks. Returns filed by banks reveal that trades with corporates constitute about 3 per cent of total turnover of the IRS market.

3.60 The fixed rates of 2-year and 5-year IRS (predominantly Overnight Indexed Swaps) reflect the participants' view of the future path of overnight interest rates in India[18]. That is why trading activity increases ahead of monetary policy announcement dates, particularly when the markets are uncertain about the rate move by the Reserve Bank. It tends to fall within a day or two of the announcement after squaring off of positions by traders. IRS is not liquid beyond 5-year maturity and most of the trading activity is concentrated in the 1-year. IRS was introduced with the objective of providing a tool for hedging interest rate risk of bonds (invested or issued). The largest issuers of bonds in India are public sector banks and NBFCs and 10-year maturity is a popular segment. This suggests that IRS is not used by clients to hedge their bond issuances or investments. Moreover, bonds in India, unlike in advanced countries, are not priced as a spread over swap rates. Banks price their loans to borrowers as spreads over their respective base rates which depend on their cost of funds and do not incorporate government bond or treasury bill yields. This creates a wedge between IRS and government bond yields. In fact, swap rates are often lower than that of government bond yields of comparable maturity.

3.61 Interest Rate Futures (IRF) contract was first introduced in 2003 for the 10-year sector. It received a poor response and a committee headed by Shri V.K.Sharma, Executive Director, the Reserve Bank of India, looked into product features that are best suited for Indian conditions. The reintroduced product also has not fared much better. Interaction with market participants indicates that this could be because neither the banks nor the borrowers find the product as an effective hedge, since their exposures are to the Base Rate which is not currently having any link to the underlying rate of the IRF. Banks (which hold around 37 per cent), Insurance companies (around 22 per cent), the Reserve Bank (around 13 per cent) and Provident Funds (around 7 per cent) together hold four-fifths of the outstanding government bonds and do not require marking-to-market. One more reason for lower interest, according to market participants, is the relatively restricted regulatory regime for shorting of securities. Cash-and-carry arbitrage strategies, which often provide volumes to the market are rare. The IRF, as a result, failed to provide liquidity to bonds in the deliverable basket. There is a fear among participants that they will have to take delivery of the Cheapest-To-Deliver (CTD) security in the deliverable basket, typically a very illiquid one.

Regulatory Initiatives for Financial Inclusion and Financial Stability

3.62 Financial Inclusion is the process of ensuring access to appropriate financial products and services needed by all sections of the society in general and vulnerable groups such as weaker sections and low income groups in particular, at an affordable cost in a fair and transparent manner by regulated mainstream institutional players. Globally, the triad of Financial Inclusion, Financial Literacy and Consumer Protection has been recognized as intertwining threads in pursuit of Financial Stability. For any kind of stability, whether financial, economic, political or social, inclusive growth is an essential prerequisite. Inclusive growth, in turn, is largely driven by financial inclusion and an inclusive financial system. Financial Inclusion and financial literacy are complementary to each other. For

[18] They are the market's neutral view about the Reserve Bank's policy rate and its ability to influence the call rate.

EDEs, ensuring adequate access to financial products and services is important at their current stage of development. The lack of easy access to financial products creates demand for non-financial products like gold and real estate[19]. Financial literacy creates demand for financial products and services and thus encourages a more sustainable growth of the financial sector.

Reserve Bank of India

3.63 The Reserve Bank is furthering financial inclusion through a combination of strategies ranging from relaxation of regulatory guidelines (*e.g.* simplified Know Your Customer (KYC) norms), provision of new products and other supportive measures to achieve sustainable and scalable financial inclusion. It has a structured and planned approach to financial inclusion wherein all banks have prepared Board approved Financial Inclusion Plans (FIPs) with a three year horizon extending up to 2013. The initial goal of providing access to banking services in all villages with population more than 2000 by March 2012 has been successfully met and the focus now has shifted to providing banking services for all the other villages in a time bound manner. The focus now is more on the volume of transactions in new accounts opened as a part of the financial inclusion drive.

3.64 India has adopted a bank-led model for financial inclusion which seeks to leverage on technology. The financial inclusion initiatives would have to be Information and Communication Technology (ICT) based and would ride on new delivery models that would need to be developed by the market participants to best suit their requirements. Experience shows that the goal of financial inclusion is better served through mainstream banking institutions as only these institutions have the ability to offer the suite of products required to bring in effective/meaningful financial inclusion. Other players such as mobile companies have been allowed to partner with banks in offering services collaboratively.

3.65 To meet the criterion of availability of banking services, banks have been advised to offer a minimum of four basic products to customers, *viz.* a basic savings bank deposit account with emergency credit facility like overdraft; a remittance product for Electronic Benefit Transfer and other remittances; a pure savings product such as a recurring deposit or a variable recurring deposit and facility of entrepreneurial credit such as General Credit Card and Kisan Credit Card. In order to further strengthen the ongoing financial inclusion agenda in India, a high level Financial Inclusion Advisory Committee has been constituted by the Reserve Bank. The Committee would pave the way for developing a viable and sustainable banking services delivery model focusing on accessible and affordable financial services, developing products and processes for rural and urban consumers presently outside the banking network and for suggesting appropriate regulatory framework to ensure that financial inclusion and financial stability move in tandem.

3.66 The Reserve Bank has been spearheading financial inclusion efforts through credit allocation norms mandating scheduled commercial banks to lend to the priority sector. More recently, the Reserve Bank had set up a Committee to re-examine the existing classification of priority sector lending and suggest revised guidelines with regard to priority sector lending classification and related issues (Chairman: Shri M. V. Nair). Based on the Committee's report and suggestions/ comments received from various stakeholders, the guidelines on priority sector lending were revised by the Reserve Bank on July 20, 2012. In terms of the revised guidelines, foreign banks with 20 or more branches have been brought at par with the domestic commercial banks in terms of the target/ sub-targets under priority sector lending to 40 per cent from 32 per cent of Average Net Bank Credit or Credit Equivalent amount of Off Balance Sheet Exposures, whichever is higher, as on March 31 of the previous year.

Lead Bank Scheme

3.67 To ensure provision of banking services across India especially in rural areas, the lead banks (under the Lead Bank Scheme) were advised to draw up a roadmap to provide banking services through a banking outlet in every village having a population of over 2000. Under the roadmap, out of 74,414 such unbanked villages identified and allotted to various banks (public

[19] Chapter I has discussed the issue of higher non-financial savings in the country *vis-à-vis* financial savings in the household sector.

sector, private sector and Regional Rural Banks (RRBs)), banking outlets have been opened in 74,199 villages as on March 31, 2012, comprising 2493 branches, 69374 Business Correspondent (BC) and 2332 through other modes like rural Automated Teller Machines (ATMs), mobile van, satellite branch, *etc.* Banks are being encouraged to start with Electronic Benefit Transfer (EBT) services. The objective is to provide a bank account to every household/person throughout the country. Hence, banks should endeavour to have a BC touch point in each of the villages in the country, to start with, through provision of EBT services, at least once a fortnight to facilitate transfer of all State benefits including Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) wages and various cash subsidies to beneficiaries by direct credit to the bank accounts.

3.68 In order to enhance the penetration of banking services in Tier 2 centres (with population of 50,000 to 99,999 as per Census 2001), RRBs have been permitted to open branches in Tier 2 centres on par with the policy for Tier 3 to 6 centres *i.e* without the need to take approval from the Reserve Bank subject to certain conditions.

Financial Inclusion Plan of banks

3.69 A major initiative taken by the Reserve Bank in January 2010 was that all public and private sector banks were advised to submit a Board approved three-year Financial Inclusion Plans (FIPs) starting April 2010. Banks were advised to devise FIPs congruent with their business strategy and comparative advantage to make it an integral part of their corporate business plans. Banks were advised to integrate the Board-approved FIPs with their business plans and to include the criteria on financial inclusion as a parameter in the performance evaluation of their staff. The implementation of these plans is being closely monitored by the Reserve Bank through quantitative and qualitative reporting and review meetings with Chairman and Managing Directors and other senior officials of banks.

3.70 A snapshot of the progress under FIP for the period March 2010 to September 2012 is in Tables 3.4 and 3.5. The number of transactions through ICT based BC outlets, though encouraging, are still very low as compared to the manifold increase in the number of

Table 3.4 Financial Inclusion Initiatives

i.	Banking connectivity has been extended to more than 1,99,702 villages up to September 2012 from 67,694 villages in March 2010. 4848 rural branches have been opened.
ii.	Numbers of Business Correspondents have increased from 34,532 to 128,054.
iii.	83.70 million Basic Savings Bank Accounts (NFAs) have been added.
iv.	7.35 million KCCs and about 0.98 million GCCs have been added.
v.	About 37 million people/families have been credit-linked.
vi.	Share of ICT based accounts have increased substantially - % of ICT accounts to NFAs has increased from 25% to 45%.

Source: RBI

Table 3.5 Progress under FIP for the period March 2010 to September 2012 (Summary of all banks including RRBs)

Particulars	Year ended Mar 10	Year ended Mar 11	Year ended Mar 12	Quarter ended Sept 12
Total No. of Branches	85457	91145	99242	101413
No. of Rural Branches	33433	34811	37471	38281
No. of CSPs Deployed	34532	60993	116548	128054
Banking outlets-Villages >2000 -Sub Total	37791	66447	112130	117570
Banking Outlets-Villages <2000-Sub Total	29903	49761	69623	82132
Banking Outlets-All Villages-Branches	33378	34811	37471	38281
Banking Outlets-All Villages-BCs	34174	80802	141136	158159
Banking Outlets-All Villages-Other Modes	142	595	3146	3262
Banking Outlets-All Villages-Total	67694	116208	181753	199702
Urban Locations covered through BCs	447	3771	5891	10985

Source: RBI

banking outlets. The focus of monitoring is now more on the number and value of transactions in no-frills accounts and also on the credit disbursed through ICT based BC outlets. In this direction, banks have been advised that FIPs prepared by their head offices are disaggregated at respective controlling offices and further at the branch level and the progress monitored periodically.

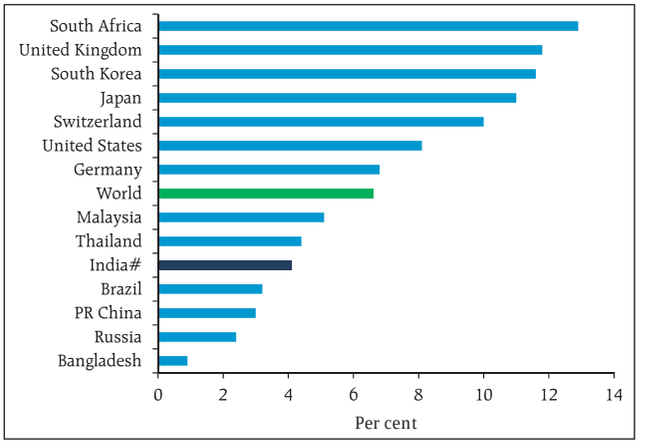
Insurance Regulatory and Development Authority (IRDA)[20]

3.71 For access to insurance products, the vast network of insurance offices including micro or one-man offices reaching out to several towns and villages is a pointer to the availability of sales touch points in smaller places. With a view to ensuring special attention to the rural, economically and socially vulnerable segments of the population, the IRDA (Rural and Social Obligations) Regulations cast obligations on Insurers to cover these segments under insurance.

3.72 The potential and performance of the insurance sector is universally assessed in the context of two parameters, *viz.*, Insurance Penetration[21] and Insurance Density[22] (Charts 3.15 and 3.16). The Insurance Penetration was 2.32 (Life 1.77 and Non-life 0.55) in the year 2000 when the sector was opened up for private sector, and has increased to 4.10 in 2011 (Life 3.4 and Non-life 0.7). The insurance density in India was US$9.9 in 2000 which has increased to US$59 in 2011 (Life 49 and Non-life 10). For the year 2011-12, more than 31 per cent of the total life insurance policies were issued in rural areas. In non-life sector, a business of ` 74.7 billion which constitutes 14.1 per cent of total non-life insurance business was generated from rural areas.

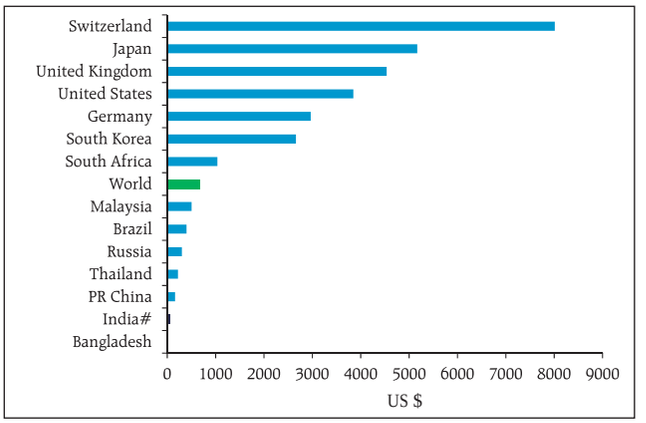
3.73 IRDA has pioneered the issuance of Micro Insurance Regulations which encourage simple and low ticket premium products covering the risks of life as well as livelihood. Many categories of individuals and entities that were considered by the Reserve Bank to act as BCs are under consideration of IRDA for according Micro Insurance Agency eligibility, with a few

Chart 3.15 Insurance Penetration in Select Countries (2011)



Note: # Data relates to financial year 2010-11 and 2011-12
Source: IRDA

Chart 3.16: Insurance Density in Select Countries (2011)



Note: # Data relates to financial year 2010-11 and 2011-12
Source: IRDA

[20] Contributed by IRDA.

[21] Insurance penetration is defined as the ratio of premium underwritten in a given year to the GDP.

[22] Insurance density is defined as the ratio of premium underwritten in a given year to the total population (measured in US$ for convenience of comparison).

exceptions. Further a number of District Cooperative Banks, Regional Rural Banks and urban co-operative banks that are working in rural and semi urban areas are also being considered for permitting to act as Micro Insurance Agents. In addition to one Life Insurance Company and one General Insurance Company, a Micro Insurance Agent is now proposed to be permitted to work with Agriculture Insurance Company of India Ltd for the limited purpose of distributing crop insurance. The proposed modified regulations also entitle the individual insurance agents, who were already licensed to act as insurance agents, in rural areas where population is not more than 2000, to the higher percentage of Micro Insurance Remuneration. Further, it is also proposed to link the higher remuneration / commission rates payable on Second and Subsequent years' premium to the persistency rate of Micro Insurance business portfolio of Micro Insurance Agent so as to encourage and emphasize on the quality of business.

3.74 As regards the scope of Micro Insurance Products, in the existing regulations, non life Micro Insurance (MI) products are covering retail risks faced by individuals. They do not address the institutional risks faced by Micro, Small and Medium enterprises that are playing a significant role in the country's growth. Therefore, a proposal is under consideration that General (Non Life) Insurance policies issued to Micro, Small and Medium Enterprises as defined in Section 7 of Micro, Small and Medium Enterprises Development (MSMED) Act, 2006 under various classes of non-life insurance business will be qualified as non-life micro insurance business up to a premium of ` 25000 per annum per policy. However, the non life insurance companies will have enough discretion to decide whether to appoint MI Agents, if so to which sector / enterprises of MSME Sector.

Pension Fund Regulatory and Development Authority (PFRDA)[23]

3.75 Old age protection is an essential part of the social security needs of the unorganized sector and should form an important welfare goal. Introducing a Defined Contribution pension scheme (NPS-Swavalamban) for the unorganized sector workers enabling them to save small amounts during their productive years with a co-contribution from the government is an important step in achieving old age income security. Not only does the scheme enable aggregation of small savings, it also helps the government in limiting its liability and projecting the funding requirement. A number of countries such as Mexico, Vietnam run such co-contributory pension schemes.

Securities and Exchange Board of India(SEBI)[24]

3.76 SEBI is furthering financial inclusion *via* a number of measures. With a view to achieve wider financial inclusion, encourage holding of demat accounts and to reduce the cost of maintaining securities in demat accounts for retail individual investors, SEBI has decided that all depository participants (DPs) shall provide a "Basic Services Demat Account" (BSDA) with limited services, which will not charge any fee upto holding worth of `50,000/- and nominal charge of `100/- upto holding of `2,00,000/-. In order to encourage participation of small investors (who may not be tax payers and may not have Permanent Account Number (PAN)/bank accounts, the KYC requirement (such as PAN, Bank A/c's *etc.*) has been relaxed for the investment upto `20,000 per investor, per mutual fund, per financial year subject to certain conditions. In order to encourage distribution of Mutual Fund products to semi-urban and rural areas, additional Total Expense Ratio (TER) upto 30 basis points has been allowed to be charged if net flows from beyond 15 cities are at least 30 per cent of gross new inflows / 15 per cent of assets under management. Other measures such as increasing the category of persons to be employed as mutual fund distributors have been undertaken to improve mutual fund penetration in rural and semi-urban areas.

3.77 SEBI has initiated a multipronged approach to spread financial literacy all over India. Investor Awareness Programs/ Workshops are organized for educating investors and to spread awareness. Regional Seminars are conducted in association with various exchanges, depositories and trade bodies.

[23] Contributed by PFRDA.
[24] Contributed by SEBI.

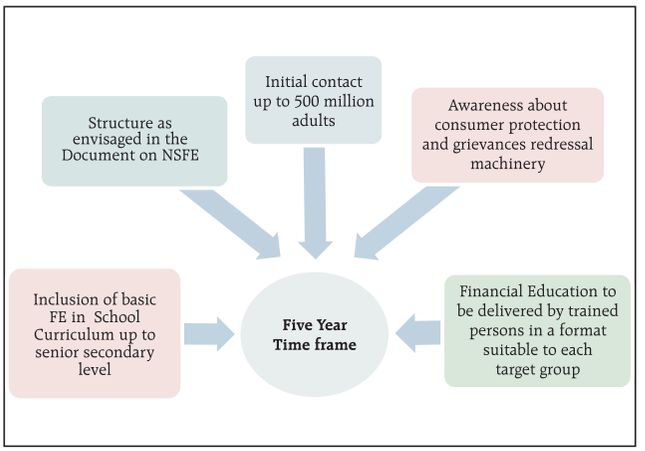
The objective of such seminars is to reach out to more people and concentrating primarily on tier 2 and tier 3 cities. SEBI continues its association with Investor Associations (IA) as well as Exchanges, Depositories and various trade bodies *etc.* It has launched a financial education drive through Resource Persons (RPs). The program aims at imparting understanding of financial concepts to the targeted groups. These empanelled RPs also supplement the investor education programs that are conducted through investor associations. A Pocket Money Program for school students jointly with National Institute of Securities Market is positioned as an important life skill at the school level (including municipal schools) targeting mainly 8th and 9th standard students.

National Strategy on Financial Education (NSFE)

3.78 A draft document on the NSFE has been prepared under the aegis of the Technical Group on Financial Inclusion and Financial Literacy, set up by the Sub Committee of the FSDC. The draft Strategy seeks to create a financially aware and empowered India. The Technical Group had constituted a Sub Group to draft the NSFE for India. The Strategy prepared by the Group envisages ways towards creating awareness and educating consumers on access to financial services; availability of various types of products and their features; changing attitudes to translate knowledge into responsible financial behaviour; and making consumers of financial services understand their rights and obligations. The Strategy calls for active involvement of individuals, financial sector regulators, educational institutions, NGOs, financial sector entities, multilateral international players and the Government at both the Centre and the States. The Strategy envisages a time frame of five years for its financial education campaign (Chart 3.17).

3.79 The draft NSFE was placed in the public domain by all the financial regulators for public consultation in August 2012. Currently, the Technical Group is finalising the Strategy and drawing up a road map for its implementation.

Chart 3.17: Action Plan for NSFE



Annex

Methodologies

Macroeconomic Stability Map

The Macroeconomic Stability Map is based on seven sub-indices, each pertaining to a specific area of macroeconomic risk. Each sub-index on macroeconomic risk includes select parameters representing risks in that particular field. These sub-indices have been selected based on their impact on macroeconomic or financial variable such as GDP, inflation, interest rates or assets quality of banks. The seven sub-indices of the overall macroeconomic stability index and their components are briefly described below:

Global Index: The global index is based on output growth of the world economy. A fall in output growth affects overall sentiments for the domestic economy in general and has implications for demand for domestic exports, in particular. Capital flows to the domestic economy are also affected by growth at the global level. Therefore, a fall in output growth is associated with increased risks.

Domestic Growth: The domestic growth index comprises of growth of gross domestic product. A fall in growth, usually, creates headwinds for bank asset quality, capital flows and over-all macroeconomic stability. Hence, a fall in growth is associated with increased risks.

Inflation: Wholesale Price Index Inflation is used to arrive at the Inflation Index. Increase in inflation reduces purchasing power of individuals and complicates investment decision of corporates. Therefore, an increase in inflation is associated with higher risks.

External Vulnerability Index: The Current Account Deficit to GDP Ratio, Import Cover and ratio of Short Term Debt to Total Debt are included in the external vulnerability Index. In the Indian context, the CAD depicts the resources that need to be raised to finance imports that are in excess of exports. Capital flows from abroad can be volatile and could pose a problem in being able to finance the CAD, thereby increasing external vulnerability. Similarly, reserves cover of imports and ratio of short term debt to total debt are indicators of external vulnerability. Rising CAD and ratio of short term debt to total debt and falling import cover depict rising vulnerability.

Fiscal Index: The fiscal index is based on fiscal deficit and primary deficit. Higher deficits are associated with higher risk. High government deficit, in general, reduces the resources available to the private sector for investment and also has implications for inflation.

Corporate Index: The health of the corporate sector is captured through profit margin. The risks emanating from the sector are inversely related to it. Similarly, the interest coverage ratio depicts whether firms are able to meet the interest expenses. A lower interest coverage ratio is associated with higher risks.

Household Index: Incremental credit to deposit ratio and retail non-performing assets comprise the household index. Increase in both variables is associated with higher risk.

The current map is based on the data available till June 2012.

Financial Markets Stability Map

With the objective to measure stability of the financial market, Financial Market Stability Map has been prepared based on the indicators of four sectors/markets namely banking sector, foreign exchange market, equity market and debt market. The indicators selected from various sectors/markets are following; i) Banking Sector: Banking Beta of CNXBANK Index and NIFTY Index, CD Rate and CD rate minus Implied Forward rate, ii) Foreign Exchange Market: CMAX of daily INR-US Dollar exchange rate, which is defined as $X_t/Max(X_i, i=1,2,..upto\ one\ year)$. Where, X_t is the INR-US Dollar exchange rate at time t, and 25 Delta Risk Reversals of foreign exchange rate,

iii) Equity Market: Inverse of NIFTY CMAX and India VIX, and iv) Debt Market: Corporate bond which is average return of corporate bonds rated A, AA, and AAA, 10-years Government bond yield and CP Rate.

Variance-equal transformation has been used to convert the indicators at same level before construction of the Map. Four indicators for the four selected sectors/market were prepared based on simple average of elementary indicators which are presented as a cobweb map.

The current map is based on the data available till November 2012.

Banking Stability Map and Indicator

The Banking Stability Map and Indicator (BSI) present an overall assessment of changes in underlying conditions and risk factors that have a bearing on stability of the banking sector during a period. Following ratios are used for construction of each composite index:

Table : Indicators used for construction of Banking Stability Map and Banking Stability Indicator

Dimension	**Ratios**			
Soundness	CRAR	Tier-I Capital to Tier-II Capital	Leverage ratio as Total-Assets to Capital and Reserves	
Asset-Quality	Net NPAs to Total-Advances	Gross NPAs to Total-Advances	Sub-Standard-advances to gross NPAs	Restructured-Standard-Advances to Standard-Advances
Profitability	Return on Assets	Net Interest Margin	Growth in Profit	
Liquidity	Liquid-Assets to Total-Assets	Customer-Deposits to Total-Assets	Non-Bank-Advances to Customer-Deposits	Deposits maturing within-1-year to Total Deposits
Efficiency	Cost to Income	Business (Credit + Deposits) to staff expenses		Staff Expenses to Total Expenses

The five composite indices represent the five dimensions of Soundness, Asset-quality, Profitability, Liquidity and Efficiency. Each index, representing a dimension of bank functioning, takes values between zero (minimum) and 1 (maximum). Each index is a relative measure during the sample period used for its construction, where a high value means the risk in that dimension is high. Therefore, an increase in the value of the index in any particular dimension indicates an increase in risk in that dimension for that period as compared to other periods. For each ratio used for a dimension, a weighted average for the banking sectors is derived, where the weights are the ratio of individual bank asset to total banking system assets. Each index is normalized for the sample period as 'Ratio-on-a-given-date minus Minimum-value-in-sample-period divided by maximum-value-in-sample-period minus Minimum-value-in-sample-period'. A composite measure of each dimension is calculated as a weighted average of normalised ratios used for that dimension, where the weights are based on the marks assigned for assessment for CAMELS rating. Based on the individual composite indices for each dimension, the Banking Stability Indicator is constructed as a simple average of these five composite sub-indices.

For the current map and indicator, the sample period for assessment was taken from March 2001 to September 2012.

Stress Testing of Derivatives Portfolio of Select Banks

The stress testing exercise focused on the derivatives portfolio of a representative sample set of banks. The top 26 banks in terms of notional value of derivatives portfolio as at end December 2011 were selected for the analysis. Each bank in the sample was asked to assess the impact of stress conditions on their respective derivatives portfolios as on September 30, 2012.

In case of domestic banks, the derivatives portfolio of both domestic and overseas operations was included. In case of foreign banks, only the domestic (i.e. Indian) position was considered for the exercise. For derivatives trade where hedge effectiveness was established was exempted from the tests, while all other trades were included.

The stress scenarios incorporated four sensitivity tests consisting of the spot USD/INR rate and domestic interest rates as parameters

Table: Shocks for Sensitivity Analysis

	Domestic Interest Rates	
Shock 1	Overnight	**+250 bps**
	Upto 1yr	**+150 bps**
	Above 1yr	**+100 bps**

	Domestic Interest Rates	
Shock 2	Overnight	**-250 bps**
	Upto 1yr	**-150 bps**
	Above 1yr	**-100 bps**

	Exchange rates	
Shock 3	USD/INR	**+20 per cent**

	Exchange Rates	
Shock 4	USD/INR	**-20 per cent**

Single Factor Sensitivity Analysis – Stress Testing

As a part of quarterly surveillance, stress tests are conducted covering credit risk, interest rate risk, equity price risk, foreign exchange risk, liquidity risk etc. Resilience of the commercial banks in response to these shocks is studied. The analysis covers all scheduled commercial banks. Single factor sensitivity analysis on credit risk of scheduled urban co-operative banks and non-banking financial companies are also conducted.

Credit Risk

To ascertain the resilience of banks, the credit portfolio was shocked by increasing NPA levels, for the entire portfolio as well as for select sectors, along with a simultaneous increase in provisioning requirements. For testing the credit concentration risk, default of the top individual borrowers and the largest group borrower is assumed. The estimated provisioning requirements so derived were adjusted from existing provisions and the residual provisioning requirements, if any, were deduced from banks' capital.

The analysis was carried out both at the aggregate level as well as at the individual bank level, based on supervisory data as on September 30, 2012. The scenario assumed enhanced provisioning requirements of 1 per cent, 30 per cent and 100 per cent for standard, sub-standard and doubtful/loss advances, respectively. The assumed increase

in NPAs was distributed across sub-standard, doubtful and loss categories in the same proportion as prevailing in the existing stock of NPAs. The additional provisioning requirement was applied to the altered composition of the credit portfolio.

Liquidity Risk

The aim of liquidity stress tests is to assess the ability of a bank to withstand unexpected liquidity drain without taking recourse to any outside liquidity support. The analysis is done as at end-September 2012. The scenario depicts different proportions (depending on the type of deposits) of unexpected deposit withdrawals on account of sudden loss of depositors' confidence and assesses the adequacy of liquid assets available to fund them.

The definitions of liquid assets are taken as:

1 Cash + Inter Bank Deposits + SLR Investments

2 Cash + Inter Bank Deposits + Excess SLR Investments (only above the Statutory requirement of 23 per cent)

- It is assumed that banks would meet stressed withdrawal of deposits through sale of liquid assets only.
- The sale of investments is done with a hair cut of 10 per cent of their market value.
- The stress test is done on a static mode.

Equity price risk, foreign exchange risk and interest rate risk

The fall in value of the portfolio or income losses due to change in equity prices, appreciation/ depreciation of INR, shifting of INR yield curve are accounted for the total loss of the banks because of the assumed shock. The estimated total losses so derived were reduced from the banks' capital.

For interest rate risk in the banking Book, Duration Analysis approach was considered, for computation of the valuation impact (portfolio losses) on the investment portfolio. The portfolio losses on investments were calculated for each time bucket based on the applied shocks. The resultant losses/gains were used to derive the impacted CRAR. The valuation impact for the tests on banking book was calculated under the assumption that the HTM portfolio would be marked to market. In a separate exercise for interest rate shocks in trading book, the valuation losses were calculated for each time bucket on the interest bearing assets using duration approach.

Urban Co-operative Banks

Credit Risk

Stress tests on credit risk were conducted on Scheduled Urban Co-operative Banks (SUCBs) using their asset portfolio as at end-March 2012. The tests were based on single factor sensitivity analysis. The impact on CRAR was studied under two different scenarios. The assumed scenarios were as under:

Scenario I:

- Shock applied: 50 per cent increase in gross NPAs.
- Provisioning requirement is increased by 50 per cent.
- Capital (Tier I & II) is reduced by additional provisions.

Scenario II:

- Shock applied: 100 per cent increase in gross NPAs.
- Provisioning requirement is increased by 100 per cent.
- Capital (Tier I & II) is reduced by additional provisions.

Liquidity Risk

Liquidity stress test based on cash flow basis in 1-28 days time bucket was also conducted, where mismatch [negative gap (cash inflow less than cash outflow)] exceeding 20 per cent of outflow in 1 to 28 days time bucket was considered stressful.

Scenario I: Cash out flows in 1-28 days time bucket goes up by 50 per cent (no change in cash inflows)

Scenario II: Cash out flows in 1-28 days time bucket goes up by 100 per cent (no change in cash inflows)

Non-Banking Financial Companies (ND-SI) – Credit Risk

Stress tests on credit risk were conducted on Non-Banking Financial Companies (Non-Deposit taking and Systemically Important) using their asset portfolio as at end-June 2012. The tests were based on single factor sensitivity analysis. The impact on CRAR was studied under two different scenarios. The scenario assumed increase in the existing stock of NPAs by 200 and 500 per cent. The assumed increase in NPAs was distributed across sub-standard, doubtful and loss categories in the same proportion as prevailing in the existing stock of NPAs. The additional provisioning requirement was adjusted from the current capital position. The stress were conducted at individual NBFCs as well as at an aggregate level.

Systemic Liquidity Index

The SLI uses the following four indicators representing various segments of the market:

Weighted Average Call Rate – RBI Repo Rate

3 month Commercial Paper (CP) Rate – 3 month Certificate of Deposits (CD) Rate

3 month CD Rate – 3 month Implied Deposit Rate

Weighted Average Call Rate - 3 Month Overnight Index Swap (OIS) Rate

In order to create the Systemic Liquidity Index (SLI), the Standard normal or Variance-equal weighted method has been used.

Macro Stress Testing

To ascertain the resilience of banks, the credit risk was modeled as functions of macroeconomic variables. Credit risk stress tests have been computed using various econometric models that relate banking system aggregates to the macroeconomic variables, namely, (i) multivariate logit regression on aggregate systems' NPA data; (ii) multivariate regression in terms of the slippage ratio (inflow of new NPAs); (iii) aggregate VAR using slippage ratio; (iv) quantile regression of slippage ratio, (v) multivariate panel regression on bank-group wise slippage ratio data; and (vi) multivariate regressions for aggregate sectoral NPAs. The banking system aggregates includes current and lagged values of aggregate NPAs (NPA ratio) and inflow of new NPAs (slippage ratio), while macroeconomic variables include GDP growth, short term interest rate (call rate), WPI inflation, exports-to-GDP ratio $\left(\frac{Ex}{GDP}\right)$, gross fiscal deficit-to-GDP ratio $\left(\frac{GFD}{GDP}\right)$ and REER.

While the multivariate regressions allows evaluating the impact of selected macroeconomic variables on the banking system's NPA and capital, the VAR model reflects the impact of the overall economic stress situation on the banks' capital and NPA ratio, which also take into account feed-back effect. In these methods, conditional mean of NPA/slippage ratio is estimated and assumed that the impact of macro variables on credit quality will remain same irrespective of the level of the credit quality, which may not always be true. In order to relax this assumption, quantile regression has been adapted to project credit quality, in which, in place of conditional mean the conditional quantile has been estimated.

The Modeling Framework

The following multivariate models were run to estimate the impact of macroeconomic shocks on the aggregate NPA (npa) / slippage ratio (SR): [1]

- Aggregate banking system multivariate logit[2] regression:

$$logit\_npa_t = \alpha_1 + \beta_1\, logit\_npa_{t-1} - \beta_2\, \Delta \mathrm{GDP}_{t-2} + \beta_3\, call_{t-1} - \beta_4 \left(\frac{Ex}{GDP}\right)_{t-2}$$

  Where, $\alpha_1, \beta_1, \beta_2, \beta_3$ and $\beta_4 > 0$.

- Aggregate banking system multivariate regression:

  The analysis was carried out on slippage ratio at the aggregate level for the commercial banking system as a whole.

$$SR_t = \alpha_1 + \beta_1\, SR_{t-1} - \beta_2\, \Delta GDP_{t-2} + \beta_3\, Call_{t-1} - \beta_4 \left(\frac{Ex}{GDP}\right)_{t-2} + \beta_5 \Delta WPI_t + \beta_6 \left(\frac{GFD}{GDP}\right)_{t-1}$$

  Where, $\alpha_1, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and $\beta_6 > 0$.

- Vector AutoRegression (VAR):

  In order to judge the resilience of banking on various macroeconomic shocks, Vector Autoregressive (VAR) [3] approach has been adopted. The advantage of VAR model is that, it allows to fully capture the interaction among macroeconomic variables and banks' stability variable. It also captures the feedback effect.

  In notational form, mean-adjusted VAR of order p (VAR(p)) can be written as

$$y_t = A_1 y_{t-1} + \ldots\ldots + A_p y_{t-p} + u_t \quad ; \mathrm{t}=0,1,2,3,\ldots.$$

  Where, $y_t = (y_{1t}, \ldots\ldots, y_{Kt})'$ is a (K × 1) vector of variables at time t, the A_1 (i = 1,2,…p) are fixed (K × K) coefficient matrices and $u_t = (u_{1t}, \ldots\ldots, u_{Kt})'$ is a K-dimensional white noise or innovation process.

  In order to estimate, VAR system, slippage ratio, call rate, inflation, growth and REER were selected. The appropriate order of VAR has been selected based on minimum information criteria as well as other diagnostics and suitable order was found to be two. Accordingly, VAR of order 2 (VAR(2)) was estimated and stability of the model was checked based on roots of AR characteristic polynomial. Since, all roots are found to be inside the unit circle, this selected model was found to be fulfilling the stability condition. The impact of various macroeconomic shocks was determined using impulse response function of the selected VAR.

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[1] Slippage ratio, exports/GDP, and the call rate are seasonally adjusted.

[2] For detailed model specifications, please refer to FSR – December 2010. The logit transformation of NPA ratio is define as:

$$Logit\_npa_t = L(NPA_t) = Ln\left(\frac{NPA_t}{1-NPA_t}\right)$$

[3] For detailed VAR model specifications, please refer to FSR – June 2011.

- Quantile Regression:

  In order to estimate slippage ratio at desired level of conditional quantile, following quantile regression at 0.75 quantile (which is the present quantile the slippage ratio) was used:

$$SR_t = \alpha_1 - \beta_1 SR_{t-1} - \beta_2 \Delta GDP_{t-1} + \beta_3 Call_{t-4} - \beta_4 \left(\frac{Ex}{GDP}\right)_{t-1} + \beta_5 \Delta WPI_t + \beta_6 \left(\frac{GFD}{GDP}\right)_{t-1}$$

  Where, $\alpha_1, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and $\beta_6 > 0$.

- Bank-group wise panel fixed-effect regression:

  Bank-group wise panel regression was modeled where slippage ratio was considered as functions of macroeconomic variables. The bank-group effect were identified along with the overall model specifications.

$$SR_{it} = \alpha_i + \beta_1 SR_{i(t-1)} - \beta_2 \Delta GDP_{t-1} + \beta_3 Call_{t-2} - \beta_4 \left(\frac{Ex}{GDP}\right)_{t-1}$$

  where, α_i is the bank-group specific parameter and $\alpha_i, \beta_1, \beta_2, \beta_3,$ and $\beta_4 > 0$.

- Sectoral multivariate regression:

  The impact of macroeconomic shocks on various sectors was assessed by employing multivariate regression models using aggregate NPA ratio for each sector separately. The dependent variables consisted of lagged NPAs, sectoral GDP growth, inflation, and short-term interest rate.

Derivation of the NPAs and CRAR from the slippage ratios, which were projected from the above mentioned credit risk econometric models, were based on the following assumptions: credit growth of 16 per cent; recovery rate of 5 per cent; write-offs at 2.5 per cent and risk weighted assets growth of 18 per cent, whereas, profit growth assumed to be at 15 per cent, 5 per cent and -5 per cent under baseline, medium risk and severe risk, respectively. The regulatory capital growth is assumed to remain at the minimum by assuming minimum mandated transfer of 25 per cent of the profit to the reserves account. The distribution of new NPAs in various sub-categories was done as prevailing in the existing stock of NPAs. Provisioning requirements for various categories of advances are 0.4 per cent for standard advances, 20 per cent for sub-standard advances, 75 per cent for doubtful advances, and 100 per cent for loss advances. The projected values of the ratio of the non-performing advances were translated into capital ratios using the "balance sheet approach", by which capital in the balance sheet is affected via the provisions and net profits. It is assumed that the existing loan loss provisioning coverage ratios remain constant for the future impact.